A Database Publication

# electron user

Vol. 3 No. 7 April 1986 £1

## Graphics

**Combining colours:** learn the vital techniques

**Scrolling screens:** novel noticeboard utility

**Teach yourself micro music**

**How to recover lost disc files**

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**THE POWER OF OSWORD**
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BBC MICRO

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Electron User welcomes program listings and articles for publication. Material should be typed or computer-printed, and preferably double-spaced. Program listings should be accompanied by cassette tape or disc. Please enclose a stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication will be on an all-rights basis.

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# FIRST BYTE

## ELECTRON JOYSTICK INTERFACE

Printer Interface OUT NOW
Uses normal BBC printer commands
No software required!

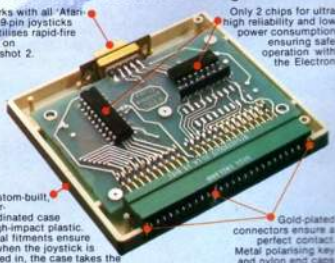
WORKS WITH MOST GAMES £19.95

### ELECTRON JOYSTICK INTERFACE

**Electron users! This is the add-on everyone wants. It's the Electron switched joystick interface from First Byte - available now with *free* conversion tape that vastly extends your game range right away.**

**The interface operates with all 'Atari-style' 9-pin joysticks, and its many advanced design features put it way out in front for quality and reliability.**

### Look at these advanced design features.

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# electron user NEWS

## Speech! gets good word on TV

A PROGRAM which enables Electrons to talk has been singled out for praise in front of ten million television viewers.

Speech!, from Superior Software, was described as "absolutely amazing" by Keith Chegwin, co-presenter of Saturday Superstore when it was featured on the programme recently.

And Fred Harris, best known for Micro Live, called Speech! "a knockout" during the same show.

It had earlier been demonstrated on Micro Live, where it was put through its paces delivering tongue twisters like "power mowers are thoroughly tough though".

How does it work? It's author David Hoskins explained: "This system allows the user to type in English or phoneme phrases which are then spoken by the program, for example '*SAY Hello I am a speech synthesiser.'

"The command can be typed directly to the computer of put into a program. Speech! will translate this command and reproduce it through the BBC's speaker".

The Electron version of Speech! is due out any day now and will cost £9.95 on cassette.

# ELECTRON SOFTWARE SUPPLIES BOOSTED

**ELECTRON software is going to be easier to find – and cheaper – thanks to an agreement between Acorn Computers and leading distributor Greyhound Marketing.**

Greyhound has acquired sole distribution rights to all the Electron titles produced by Acornsoft.

Up to 100 programs are involved, including the best-seller Elite, a number of utilities including View and Viewsheet, a host of educational software and languages such as Pascal and Logo.

"This is our vote of confidence in the Electron", Bob Simpson of Greyhound told *Electron User*. "We realise there are more than 250,000 Electron owners out there who need support.

"To date the level of support from established dealers has been fairly poor. Now we hope this will change".

Greyhound has one of the largest dealer networks for Acorn software distribution in the UK, and Electron owners, particularly those who bought their machines at Christmas, have been promised a more reliable supply of programs.

Prices will become even more reasonable.

"We shall embark on a more attractive pricing policy by packaging several programs together", said Bob Simpson.

The deal initially means that the distribution company acquires about 100,000 Electron programs.

Once these are sold, decisions will be jointly taken about re-issuing titles.

"We will make these decisions as and when stock runs out", said Simpson. "Obviously, popular titles like Elite will carry on because the demand is there.

"But I have no doubt that the majority of Electron titles will be in demand for quite a while to come.

"If we didn't anticipate a continuing market for Electron software we would not have entered into this deal".

## *STILL ON TOP . . .*

**NEARLY two years after it first appeared on the market, Mini Office – the database, spreadsheet, word processing and graphics package from Database Software for the Electron – is still topping the charts.**

**The latest non-games Top Five list in Acorn User magazine, compiled by Gallup, shows that Mini Office continues to lead the pack.**

**It beats Speech from Superior Software into second place followed by Music System from Island Logic, Typing Tutor from Pitmansoft and Forth from Acornsoft.**

## Real arcade action

*ELECTRON users have a sporting chance of winning a real arcade machine worth £400. Incentive Software has included an entry form with its new release, Moon Cresta, the version of the arcade game by Nichibutsu.*

*The winner will be chosen in a draw of those able to score more than 30,000 points in the game which involves rocket ships and kamikaze-style aliens. The cost: £7.95 on cassette, £9.95 on disc.*

## Tipped for an award

TWO Electron games are finalists in the British Microcomputing Awards. In the Home Educational Software category MirrorSoft's Mr Men is a nominee for the award.

Mirrorsoft is represented with Dynamite Dan in the Game of the Year section.

# Electron communications made easy...

Communicating with the outside world can present its own special problems for Electron users. Fortunately help is at hand, with modems and software from Pace.

Commstar is **the** communications software. The special Electron version has been adapted from the renowned Commstar software for the BBC micro. It provides a combination of powerful Viewdata and Terminal communications programs providing full telesoftware downloading facilities and a crisp mono display.

The Nightingale modem has become the standard by which others are judged. Combining simplicity of use with true multi-baud rate operation, Nightingale can provide access to both Viewdata (1200/75 and 75/1200 baud) and full duplex (300/300 baud) systems.

As a lower cost alternative, Pace can supply a quality accoustic modem which can be used in conjunction with Commstar to provide access to 1200/75 baud and 1200/1200 half duplex systems.
Either modem is available with Commstar and an RS232 serial interface as a complete package. Together they provide the only real solution to micro-communications for the Electron.

| | |
|---|---|
| **Nightingale modem, Commstar and RS232 interface** | **£119.00 + VAT** |
| **Accoustic modem, Commstar and RS232 interface** | **£79.95 + VAT** |
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* A +1 interface is required for use with above

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The only real solution for Electron communications

# When printers spell trouble

**A TELEPHONE order to a leading supplier of printers to the Electron market almost ended up in a punch-up recently. The request was for DataStar Systems to deliver 50 machines the same day to an address in the East End of London.**

**Not that there was anything particularly surprising in that as the company regularly delivers large orders at short notice. However when the driver turned up at 1 Pennington Street, Wapping, he was decidedly unwelcome.**

**For that just happens to be the new headquarters of Rupert Murdoch's News International. And as the company is currently the centre of a dispute with all the main printing unions, it was ringed by hostile pickets.**

**So when the DataStar driver told them he had 50 printers in the back of his large vehicle they were definitely not amused.**

**But anger turned to embarrassment when the van doors were opened to reveal that the printers were of the computer variety.**

**"Everyone had a good laugh about it in the end", Barry Krite of DataStar told *Electron User*, "but unfortunately the last laugh was on us – we discovered the telephone call was a hoax".**

# Superior sort of secret agent

RICK Hanson, boss of Leeds-based Superior Software, has been turned into a daring secret agent by a rival company.

Robico Software at Llantrisant, Mid-Glamorgan, have chosen his name for their new Electron adventure game which has Rick trying to steal plans for a weapons system and escaping by submarine.

Robico say: "We chose the name at random, we did not know about the real Rick Hanson, honestly!"

The real Rick has had to take some stick. He said: "Normally I do not dive from submarines, not even on holiday.

"I have not seen their game but, from what I hear, my life style is not quite so exciting".

The cassette game, £9.95, Project Thesius – Rick Hanson 2, has been written with the aid of Midge, a message compression system recently released by Robico.

# Music minus moans

FROM the Land of Song comes a software audio system to remove the boredom of music practice.

Mupados at Lampeter, Dyfed, have brightened up home tutoring for all budding musicians with Electrons.

Their package, Micro Maestro, enables a soloist to follow music on the screen. This shows a bouncing ball on each note with a metronome counting out the beats.

When the piece has been mastered the player is ready for his concert debut as lead instrumentalist with full orchestral backing.

This is achieved by popping in the cassette provided into an ordinary tape recorder containing the work of professional musicians.

The arrangement has pauses for the learner to come in with a solo instrumental piece.

Micro Maestro is a follow-up to the Mupados Recorder Tutor used in over 60 education authorities.

Cenfyn Evans, a director of the Welsh firm, himself a talented trumpet player, said: "Micro Maestro is a joint venture between ourselves and Warner Bros.

"We have our own 16 track recording studio and believe the condensed version of our Recorder Tutor will really keep up the interest of any young player who normally become bored with day-to-day practice at home.

*The Mupados Recorder Tutor in action and (below) how the score appears on the screen*

# ELECTRON BOOST FOR THE SHOW

THE first of this year's three Electron & BBC Micro User Shows is on target to break all previous records.

And the resurgence of the Electron is playing a key role.

Within days of the announcement that the show was to return to the New Horticultural Hall, London SW1 on May 16, 17 and 18, organisers Database Publications reported unusually heavy advance bookings.

"Our people have been surprised at just how much interest is specific to the Electron market", says Derek Meakin, head of Database.

"But this is only continuing the trend which started at our last show back in November".

It was at that time that exhibitors reported that the Electron had virtually put its big brother the BBC Micro in the shade.

"For the first time it seemed to be more Electron-orientated than BBC", said Andrew Hildig of Slogger Software.

"The Electron is now coming out of the BBC Micro's shadow".

Since that time in excess of 90,000 new Electrons have been sold – a fact that is very much on the minds of the forthcoming show's exhibitors.

"You can be sure there will be lots of goodies around for Electron. It's a market that manufacturers ignore these days at their peril", commented a spokesman for one major UK software house.

"The sheer volume of the machines out there now make the Electron a force with which to be reckoned".

The two other Electron & BBC Micro Shows to be held this year are scheduled for UMIST, Manchester, on September 26, 27 and 28, and at the New Horticultural Hall, once again, on November 7, 8 and 9.

# A COMBAT READY PHANTOM II WILL COST YOU £14M

*"Well produced and technically good futuristic combat flight simulation featuring some of the best and smoothest 3D graphics I've come across on the Beeb."* —
Computer Trade Weekly

**RATED 8 OUT OF 10 FOR QUALITY, GRAPHICS, PLAYABILITY & VALUE!**

More than 'just' a very fast full-flight Simulator 'Phantom Combat' offers the excitement and energy of 1500 mph air to air combat in high resolution 3D colour graphics. This 100% machine code package has been written by a military flight simulator software engineer together with the R.A.F. captain who wrote the best selling '747' simulator for Doctor Soft.

## A SIMULATOR INSIDE A SIMULATOR

In one of the training modes (formation mode: FORM) it is **actually possible to fly the Phantom AND control the Enemy aircraft** which can be clearly seen flying in 3D outside your fully equipped cockpit. Alternatively, a friend can pilot the plane (on separate keys) while you attack.

## THE ADVERSARY

Now, at last, enemy aircraft are NOT shown as arcade 'sprites', **they are computer drawn, navigated and 'flown' at a smooth 15 Frames per second**. The delta outlines reflect Soviet Mig 21 (Fishbed)/9Su 15 (Flagon) performance. In combat mode (CBAT) they fight back, intelligent and dangerous.

## INSIDE

Instrumentation is comprehensive with a wealth of clear and precise displays, **featuring both analogue and digital readouts**, eg speed in knots as shown on a dial AND digitally, with a separate Mach number display; radar; computed target range altitude and bearing shown; target pointer and gunsight; military 'Tacan' navigation (Tactical air navigation) etc.

## 'OUTSIDE'

External views includes Horizon, other aircraft, a network of ground detail points, **separate landing runways and animated 'strobe' approach lighting**. NO 'chunky' pixels, all objects are drawn in fine, high resolution coloured lines. **The view is recomputed and redrawn 15 times every second.**

## AIR TO AIR COMBAT

Warning There are no 'lives' but your single one, your score is zeroed and the program restarted if you are shot down or crash. This motivates you to try and 'bring home' a damaged aircraft. May different forms of damage can occur. Most are survivable, eg a gear up runway landing if smooth enough. **If you can't land, use the EJECTION seat and survive.**

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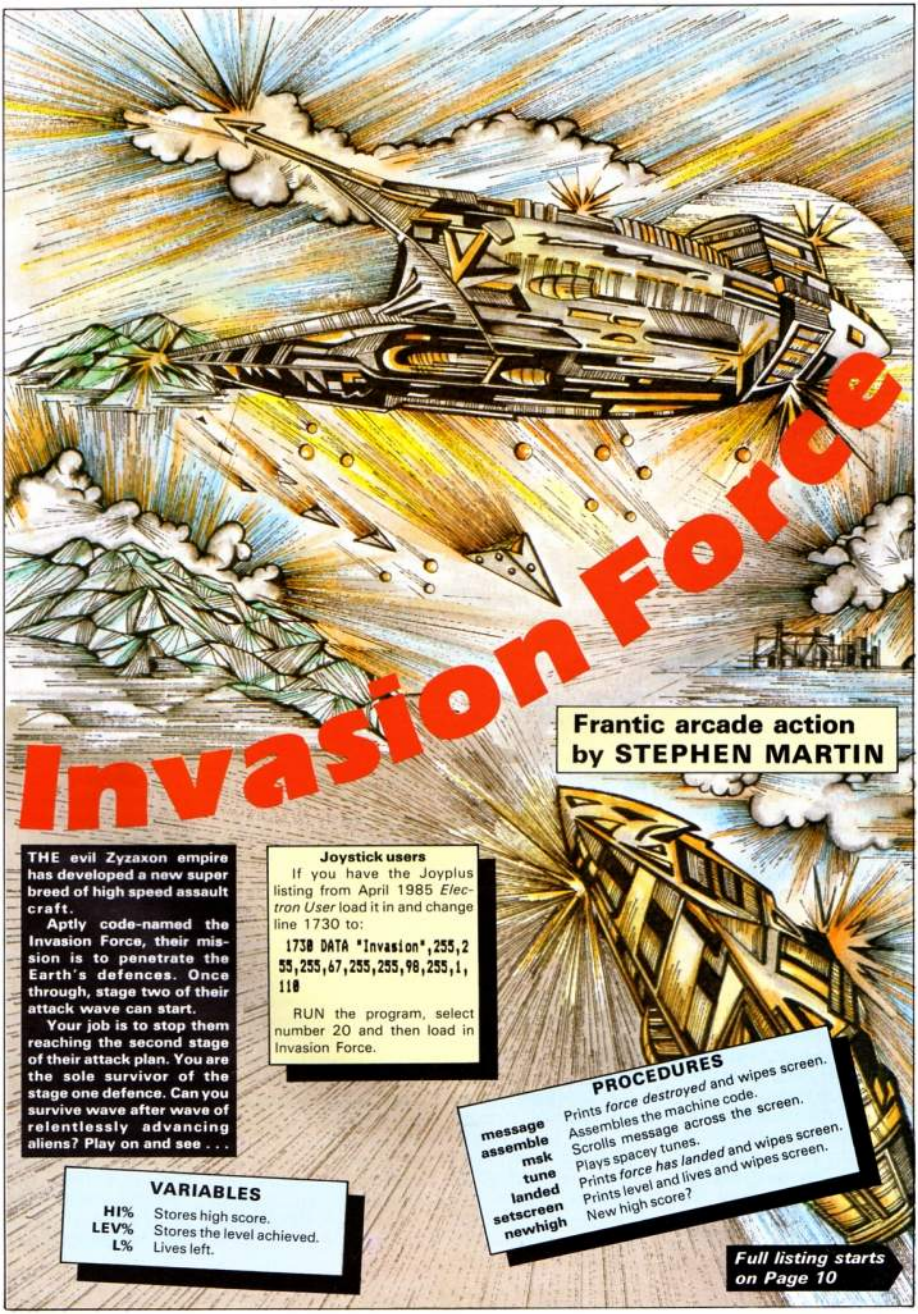
**BBC 32K ELECTRON versions**



# Invasion Force

**Frantic arcade action by STEPHEN MARTIN**

**THE evil Zyzaxon empire has developed a new super breed of high speed assault craft.**

**Aptly code-named the Invasion Force, their mission is to penetrate the Earth's defences. Once through, stage two of their attack wave can start.**

**Your job is to stop them reaching the second stage of their attack plan. You are the sole survivor of the stage one defence. Can you survive wave after wave of relentlessly advancing aliens? Play on and see . . .**

### Joystick users

If you have the Joyplus listing from April 1985 *Electron User* load it in and change line 1730 to:

```
1730 DATA "Invasion",255,2
55,255,67,255,255,98,255,1,
110
```

RUN the program, select number 20 and then load in Invasion Force.

### VARIABLES

| | |
|---|---|
| **HI%** | Stores high score. |
| **LEV%** | Stores the level achieved. |
| **L%** | Lives left. |

### PROCEDURES

| | |
|---|---|
| **message** | Prints *force destroyed* and wipes screen. |
| **assemble** | Assembles the machine code. |
| **msk** | Scrolls message across the screen. |
| **tune** | Plays spacey tunes. |
| **landed** | Prints *force has landed* and wipes screen. |
| **setscreen** | Prints level and lives and wipes screen. |
| **newhigh** | New high score? |

*Full listing starts on Page 10*

## From Page 9

```
10 REM Invasion Force
20 REM By S.Martin
30 REM (C) Electron User
40 MODE4:ENVELOPE1,129,-
50,-6,-12,11,17,172,126,0,0
,-126,126,126:ENVELOPE2,2,1
3,-2,42,71,24,112,126,0,0,-
126,126,126:ENVELOPE3,1,1,-
2,1,5,5,12,126,0,0,-126,126
,126
50 VDU23,224,0,0,0,0,15,
127,127,31,23,225,24,24,126
,126,255,255,255,255,23,226
,0,0,0,0,240,254,254,248,23
,227,0,24,24,24,24,24,24,24
,0,23,228,16,64,28,97,8,48,
148,16,23,229,255,255,255,2
55,255,255,255,255
60 VDU23,230,0,99,255,24
1,57,79,67,48,23,231,0,198,
255,143,156,242,194,12,23,2
32,96,147,15,49,25,15,17,12
,23,233,6,201,240,148,152,2
40,136,48
70 VDU23,238,0,31,57,121
,255,255,199,114,23,239,126
,255,36,36,255,153,60,0,23,
240,0,240,156,158,255,255,2
27,78,19,0,4;0;23,1;0;0;0;0
;
80 statusa=&900:statusb=
&904:statusc=&908:statusd=&
90D:DIM QX 2150:HIX=500:FOR
T=0TO2STEP2:PX=QX:[OPTT
90 .start:JSRinit:JSRres
et:.start2:JSRscreen:JSRpri
ntscore:.mainloop
100 JSRbase:JSRbigaumaa:L
DA#19:JSR&FFF4:JSRaissile:J
SRbase:JSRboabs:LDA&8C:CMP#
1:BNEhg1:JMPnolandi.hq1:JSR
erowa:JSRcalca:JSRrowa:JSR1
anded
110 JSRbase:LDA#19:JSR&FF
F4:JSRbigaumaa:JSRaissile:J
SRbase:JSRboabs:LDA&8C:CMP#
1:BNEhg2:JMPnolandi.hg2:JSR
erowb:JSRcalcb:JSRrowb
120 JSRbase:LDA#19:JSR&FF
F4:JSRbigaumaa:JSRaissile:J
SRbase:JSRboabs:LDA&8C:CMP#
1:BNEhg3:JMPnolandi.hg3:JSR
erowc:JSRcalcc:JSRrowc
130 JSRbase:LDA#19:JSR&FF
F4:JSRbigaumaa:JSRaissile:J
SRbase:JSRboabs:LDA&8C:CMP#
1:BNEhg4:JMPnolandi.hg4:JSR
erowd:JSRcalcd:JSRrowd
140 LDA&B4:CMP#1:BNEnolan
d:RTS:.nolandi:LDA&8C:CMP#1:
BNEnotdead:RTS:.notdead:LDA
&85:CMP#16:BNEsquirm:RTS:.s
quirm:JMPmainloop
150 .pauser:LDA#21:LDX#1:J
SR&FFF4:JSR&FFE0:RTS
160 .init:LDA#11:STA&70:S
TA&72:STA&74:STA&76:LDA#1:S
TA&78:STA&79:STA&7A:STA&7B:
LDA#27:STA&84:LDA#0:STA&85:
STA&8F:STA&83:STA&8C:STA&8B
:STA&B4:LDA#15:STA&80:LDA&9
0:STA&71:CLC:ADC#2:STA&73:C
LC:ADC#2:STA&75:CLC:ADC#2:S
TA&77
170 LDX#16:LDA#1:.lii:STA
&900,X:DEX:BPL lii:LDA#5:ST
A&8A:LDA#3:STA&B3:RTS:.base
:LDX#&C8:JSRinkey:TYA:BNEpa
use:LDA&80:STA&82:LDX#&BD:J
SRinkey:TYA:BEQbaseleft:INC
&80:.baseleft:LDX#&9E:JSRin
key:TYA
180 BEQprintbase:DEC&80:.
printbase:LDA&80:CMP#1:BEQr
estore:CMP#35:BEQrestore:JM
Pskipr.restore:LDA&82:STA&8
0:JMPfinishi.skipr:LDA#31:JS
R&FFEE:LDA&80:JSR&FFEE:LDA#
27:JSR&FFEE:LDA#32:JSR&FFEE
:LDA#224:JSR&FFEE:LDA#225:J
SR&FFEE:LDA#226
190 JSR&FFEE:LDA#32:JSR&F
FEE:.finish:RTS:.inkey:LDA#
129:LDY#255:JMP&FFF4:RTS
200 .rowa:LDA#31:JSR&FFEE
:LDA&70:JSR&FFEE:LDA&71:JSR
&FFEE:LDY#0:.loopa:LDAstatu
sa,Y:CMP#1:BNEovera:LDA#230
:JSR&FFEE:LDA#231:JSR&FFEE:
JMPab:.overa:LDA#32:JSR&FFE
E:JSR&FFEE:.ab:LDA#32:JSR&F
FEE:INY:CPY#4:BNEloopa:RTS
210 .rowb:LDA#31:JSR&FFEE
:LDA&72:JSR&FFEE:LDA&73:JSR
&FFEE:LDY#0:.loopb:LDAstatu
sb,Y:CMP#1:BNEoverb:LDA#230
:JSR&FFEE:LDA#231:JSR&FFEE:
JMPbc:.overb:LDA#32:JSR&FFE
E:JSR&FFEE:.bc:LDA#32:JSR&F
FEE:INY:CPY#4:BNEloopb:RTS
220 .rowc:LDA#31:JSR&FFEE
:LDA&74:JSR&FFEE:LDA&75:JSR
&FFEE:LDY#0:.loopc:LDAstatu
sc,Y:CMP#1:BNEoverc:LDA#232
:JSR&FFEE:LDA#233:JSR&FFEE:
JMPcd:.overc:LDA#32:JSR&FFE
E:JSR&FFEE:.cd:LDA#32:JSR&F
FEE:INY:CPY#4:BNEloopc:RTS
230 .rowd:LDA#31:JSR&FFEE
:LDA&76:JSR&FFEE:LDA&77:JSR
&FFEE:LDY#0:.loopd:LDAstatu
sd,Y:CMP#1:BNEoverd:LDA#232
:JSR&FFEE:LDA#233:JSR&FFEE:
JMPde:.overd:LDA#32:JSR&FFE
E:JSR&FFEE:.de:LDA#32:JSR&F
FEE:INY:CPY#4:BNEloopd:RTS
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E:LDA&78:JSR&FFEE:LDA&71:JS
R&FFEE:LDY#0:.loopa:LDAstat
usa,Y:CMP#1:BNEovere:LDA#32
:JSR&FFEE:JSR&FFEE:JMPq:.ov
ere:LDA#32:JSR&FFEE:JSR&FFE
E:.q:LDA#32:JSR&FFEE:INY:CP
Y#4:BNEloopa:RTS
250 .erowb:LDA#31:JSR&FFE
E:LDA&72:JSR&FFEE:LDA&73:JS
R&FFEE:LDY#0:.loopb:LDAstat
usb,Y:CMP#1:BNEoverf:LDA#32
:JSR&FFEE:JSR&FFEE:JMPw:.ov
erf:LDA#32:JSR&FFEE:JSR&FFE
E:.w:LDA#9:JSR&FFEE:INY:CPY
#4:BNEloopb:RTS
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R&FFEE:LDY#0:.loopc:LDAstat
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:JSR&FFEE:JSR&FFEE:JMPr:.ov
erg:LDA#32:JSR&FFEE:JSR&FFE
E:.r:LDA#9:JSR&FFEE:INY:CPY
#4:BNEloopc:RTS
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E:LDA&76:JSR&FFEE:LDA&77:JS
R&FFEE:LDY#0:.loopd:LDAstat
usd,Y:CMP#1:BNEoverr:LDA#32:
JSR&FFEE:JSR&FFEE:JMPt:.ove
r:LDA#32:JSR&FFEE:JSR&FFEE:
.t:LDA#9:JSR&FFEE:INY:CPY#4
:BNEloopd:RTS
280 .calca:LDA&78:CMP#1:B
NEleftA:INC&70:.leftA:CMP#2
:BNEcheckA:DEC&70:.checkA:L
DA&70:CMP#26:BNEcheck2A:LDA
#2:STA&78:INC&71:.check2A:L
DA&70:CMP#3:BNEnoturnA:LDA#
1:STA&78:INC&71:.noturnA:RT
S
290 .calcb:LDA&79:CMP#1:B
NEyy:INC&72:.yy:CMP#2:BNEff
:DEC&72:.ff:LDA&72:CMP#26:B
NEoo:LDA#2:STA&79:INC&73:.o
o:LDA&72:CMP#3:BNEll:LDA#1:
STA&79:INC&73:.ll:RTS
300 .calcc:LDA&7A:CMP#1:B
NEddi:INC&74:.dd:CMP#2:BNEkk
:DEC&74:.kk:LDA&74:CMP#26:B
NEop:LDA#2:STA&7A:INC&75:.o
p:LDA&74:CMP#3:BNEkl:LDA#1:
STA&7A:INC&75:.kl:RTS
310 .calcd:LDA&7B:CMP#1:B
NEleftd:INC&76:.leftd:CMP#2
:BNEcheckd:DEC&76:.checkd:L
DA&76:CMP#26:BNEcheck2d:LDA
#2:STA&7B:INC&77:.check2d:L
DA&76:CMP#3:BNEnoturnd:LDA#
1:STA&7B:INC&77:.noturnd:RT
S
320 .table:EQUB&1:EQUB&1:
EQUB&0:EQUB&2:EQUB&2:EQUB&0
:EQUB&3:EQUB&3:EQUB&0:EQUB&
4:EQUB&4:.missile:LDA&84:CM
P#27:BEQnofire:JMPfireing:.
nofire:LDX#&FF:JSRinkey:TY
A:BEQback:LDX#fah MOD 256:L
DY#fah DIV 256:LDA#7:JSR&FF
F1:JMPbasefire:.back:RTS
330 .basefire:LDA&80:STA&
83:INC&83:INC&83:.firering:
LDA#31:JSR&FFEE:LDA&83:JSR&
FFEE:LDA&84:JSR&FFEE:LDA#32
:JSR&FFEE:DEC&84:LDA&84:CMP
#4:BNEnottop:LDA#27:STA&84:
RTS:.nottop:LDA#31:JSR&FFEE
:LDA&83:JSR&FFEE:LDA&84
340 JSR&FFEE:LDA#135:JSR&
FFF4:TIA:CMP#134:BEQhit2:CM
P#135:BEQhit2:CMP#136:BEQhi
t1:CMP#137:BEQhit1:CMP#133:
BEQyepi:LDA#227:JSR&FFEE:RT
S:.yepi:LDA#32:JSR&FFEE:JMP
noram:.hit2:JSRadd2@@:JMPpen
qor.hit1:JSRadd1@@:JMPpenqo
350 .nnn:JSRadd2@@:.penqo
:LDA&84:CMP&77:BNEnof:SEC:L
DA&83:SBC&76:TAY:LDA table,
Y:STA&8E:LDX&8E:LDA@@:STA&9
@C,X:JMPreturn:.nof:LDA&84:
CMP&75:BNEsecond:SEC:LDA&83
:SBC&74:TAY:LDA table,Y:STA
&8E
360 LDX&8E:LDA@@:STA&9@7,
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CMP&73:BNEfirst:SEC:LDA&83:
```
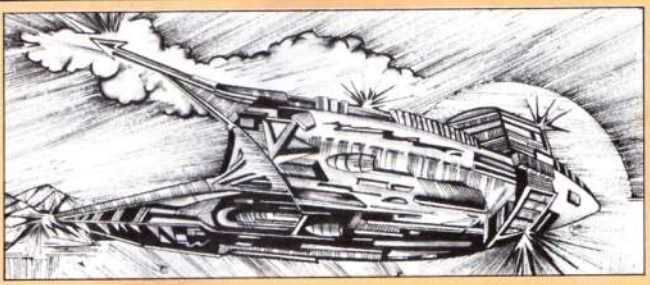



```
SBC&72:TAY:LDA table,Y:STA&
8E:LDX&8E:LDA&0:STA&93,X:J
MPreturn:.first:LDA&84:CMP&
71:BNEreturn:SEC:LDA&83:SBC
&70:TAY:LDA table,Y:STA&8E:
LDX&8E:LDA&0:STA&FF,X

 370 .return:LDA&73:JSR&FF
EE:LDA&83:JSR&FFEE:LDA&84:J
SR&FFEE:LDA&228:JSR&FFEE:LD
X&explo MOD 256:LDY&explo D
IV 256:LDA&7:JSR&FFF1:INC&8
5:.nora:LDA&27:STA&84

 380 JMPprintbase:.screen:
LDA&31:JSR&FFEE:LDA&7:JSR&F
FEE:LDA&22:JSR&FFEE:LDX&0:.
output1:LDAbunker,X:JSR&FFE
3:INX:CMP&13:BNEoutput1:LDA
&31:JSR&FFEE:LDA&19:JSR&FFE
:LDA&22:JSR&FFEE:LDX&0:.ou
tput2:LDAbunker,X:JSR&FFE3:
INX

 390 CMP&13:BNEoutput2:LDA
&31:JSR&FFEE:LDA&31:JSR&FFE
E:LDA&22:JSR&FFEE:LDX&0:.ou
tput3:LDAbunker,X:JSR&FFE3:
INX:CMP&13:BNEoutput3:JMPre
st:.bunker:EQUS CHR$229+CHR
$229+CHR$229+CHR$18+CHR$8+C
HR$8+CHR$8+CHR$8+CHR$229+CH
R$229+CHR$229+CHR$229

 400 EQUS CHR$229+CHR$18+C
HR$8+CHR$8+CHR$8+CHR$8+CHR$
8+CHR$229+CHR$229+CHR$229+C
HR$229+CHR$229+CHR$18+CHR$8
+CHR$8+CHR$8+CHR$8+CHR$8+CH
R$229+CHR$229+CHR$32+CHR$22
9+CHR$229+CHR$13

 410 .explo EQUD&0002001:
EQUD&000A0004:.fah:EQUD&000
10011:EQUD&000500FF

 420 .rest:LDX#0:.ou:LDAst
at,X:JSR&FFE3:INX:CMP#13:BN
Eou:RTS:.stat:EQUS CHR$31+C
HR$7+CHR$1+"LEVEL     SCORE
     LIVES"+CHR$31+CHR$17+C
HR$2+"00000"+CHR$13

 430 .bombs:LDA&31:JSR&FFE
E:LDA&7C:JSR&FFEE:LDA&7D:JS
R&FFEE:INC&7D:LDA&7D:CMP#28
:BEQreset:LDA#32:JSR&FFEE:L
DA#31:JSR&FFEE:LDA&7C:JSR&F
FEE:LDA&7D:JSR&FFEE:LDA#135
:JSR&FFF4:TXA:CMP#133:BEQre
set:CMP#128:BEQboom:CMP#129
:BEQboom:CMP#130:BEQboom

 440 LDA#227:JSR&FFEE:RTS:
.reset:LDA#32:JSR&FFEE:LDA&
8A:STA&7C:INC&7C:LDA#4:STA&
7D:RTS:.boom:LDA#31:JSR&FFE
E:LDA&80:JSR&FFEE:LDA#27:JS
R&FFEE:LDA#32:JSR&FFEE:LDA#
228:JSR&FFEE:JSR&FFEE:JSR&F
FEE:LDA#1:STA&8C:RTS

 450 .bigbumma:LDA#31:JSR&
FFEE:LDA&8A:JSR&FFEE:LDA#4:
JSR&FFEE:LDA#32:JSR&FFEE:JS
R&FFEE:JSR&FFEE:LDA&8B:CMP#
1:BEQscrag:INC&8A:JMPpang:.
scrag:DEC&8A:.pang:LDA&8A:C
MP#2:BEQfrak:CMP#34:BEQzala
ga:.bumma:LDA#31:JSR&FFEE:L
DA&8A:JSR&FFEE:LDA#4

 460 JSR&FFEE:LDA#238:JSR&
FFEE:LDA#239:JSR&FFEE:LDA#2
40:JSR&FFEE:RTS:.frak:INC&8
A:LDA&8B:STA&8B:JMPbumma:.za
laga:DEC&8A:LDA#1:STA&8B:JM
Pbumma

 470 .printscore:LDA#31:JS
R&FFEE:LDA#17:JSR&FFEE:LDA#
2:JSR&FFEE:LDA&87:LSRA:LSRA
:LSRA:LSRA:CLC:ADC#48:JSR&F
FEE:LDA&87:AND#&0F:CLC:ADC#
48:JSR&FFEE:LDA&88:LSRA:LSR
A:LSRA:LSRA:CLC:ADC#48:JSR&
FFEE:LDA&88:AND#&0F:CLC:ADC
#48:JSR&FFEE:RTS

 480 .add100:SED:CLC:LDA&8
8:ADC#10:STA&88:LDA&87:ADC#
0:STA&87:CLD:JMPprintscore:
.add200:SED:CLC:LDA&88:ADC#
32:STA&88:LDA&87:ADC#0:STA&
87:CLD:JMPprintscore:.lande
d:LDA&71:CMP#28:BEQhagar:RT
S:.hagar:JSRboom:LDA#1:STA&
B4:RTS

 490 RTS:];NEXT

 500 CLS:PROCask("INVASION
 FORCE",10,1):PRINTTAB(7,10
)"I  -  FOR  -  LEFT"
:PRINTTAB(7,12)"X  -  FO
R  -  RIGHT":PRINTTAB(5,
14)"SHIFT  -  FOR  -  F
IRE":PRINTTAB(7,16)"P  -
  FOR  -  PAUSE"

 510 PRINTTAB(11,5)"HI SCO
RE=":PRINTTAB(21,5);HI%;"0"
:PRINTTAB(7,19)"S  -  FO
R  -  SOUND":PRINTTAB(7,
21)"Q  -  FOR  -  QUI
ET":PRINTTAB(11,25)"SOUND S
TATUS=ON":PROCask("SPACE TO
 START",11,28):*FX21,0

 520 *FX210,0

 530 REPEAT:A$=GET$:IFA$="
Q":PRINTTAB(24,25);"OFF";:*
FX210,10

 540 IFA$="S":PRINTTAB(24,
25);"ON ";:*FX210,0

 550 UNTIL A$=" ":PROCtune
("9876543210&6677:8:899:;;;:
;;;;;;",3,2)

 560 LEVX=0:LX=3:?&90=5:?&
87=0:?&88=0:CLS:PRINTTAB(9,
2);LEVX:PRINTTAB(29,2);LX

 570 REPEAT

 580 CALLQX

 590 IF?&B4=1:?&B4=0:PROCl
anded:GOTO580

 600 IF?&85=16THENLEVX=LEV
X+1:PROCsetscreen:PROCmessa
ge:GOTO580

 610 LX=LX-1:SOUND0,-10,15
,20:PROCsetscreen:FORT=1TO2
000:NEXT

 620 IF?&8C=1 AND LX)1:?&8
C=0:CALLstart2:GOTO600

 630 UNTIL LX=0

 640 SCX=1000+((?&87 AND &
F0)DIV &10)+100+(?&87 AND &
F)+10+((?&88 AND &F0) DIV &
10)+(?&88 AND &F):IF SCX)HI
X:PROCnewhigh

 650 GOTO500

 660 DEFPROCsetscreen:PRIN
TTAB(9,2):LEVX:PRINTTAB(29,
2):LX:GCOL0,0:FORIX=0TO1280
STEP4:MOVEIX,100:DRAWIX,930
:NEXT:GCOL0,1:ENDPROC

 670 DEFPROCmessage:PRINTT
AB(10,10);"FORCE ";LEVX;" D
ESTROYED":FORT=1TO1000:NEXT
:GCOL0,0:FORIX=0TO1280STEP4
:MOVEIX,600:DRAWIX,700:NEXT
:GCOL0,1

 680 ?&90=?&90+1:IF?&90=16
:?&90=5

 690 ENDPROC

 700 DEFPROClanded:SOUND0,
-10,15,15:PROCsetscreen:PRI
NTTAB(13,10);"FORCE HAS LAN
DED":FORT=1TO1000:NEXT:PROC
tune("677:8:899:;;;;;;;;;;"
,3,2):GCOL0,0:FORIX=0TO1280
STEP4:MOVEIX,600:DRAWIX,700
:NEXT:GCOL0,1:ENDPROC

 710 DEFPROCtune(S$,CX,DX)
:FORVX=1TOLEN(S$):NX=(ASC(M
ID$(S$,VX,1))-43)*8:SOUND1,
CX,NX,DX:NEXT:ENDPROC

 720 DEFPROCnewhigh:HIX=SC
X:CLS:PRINTTAB(12,10);"NEW
HIGH SCORE!":VDU19,1,8;0;:P
ROCtune("12345678901234567
9677:8:899:;;;;;;;;;;",3,2)
:FORT=1TO3000:NEXT:VDU19,1,
7;0;:ENDPROC

 730 DEFPROCask(A$,XC%,YC%
):LOCAL X%,Y%,P%,I%:X%=XC%:
Y%=YC%:I%=X%+LENA$:FORT=1TO
LENA$:X%=X%+1:F$=MID$(A$,T,
1):FORP%=I%TOX%STEP-1:PRINT
TAB(P%,Y%);F$:NEXT:NEXT:END
PROC
```

*This listing is included in this month's cassette tape offer. See order form on Page 61.*

*Product: Astro Plumber*
*Price: £2.50*
*Supplier: Blue Ribbon Software, Silver House, Silver Street, Doncaster. Tel: 0302 21134*

## Lunar cavern capers

IF you are a devotee of moving through underground caverns while trying to avoid mutant monsters, then Astro Plumber is well worth looking at, especially as it is firmly at the budget end of the market, available on cassette for just £2.50.

The scenario is the moon, and you play the role of the plumber who has recently arrived at Colony 11 to fix a rather leaky air supply system.

What else would you use to mend leaking pipes but a plasma laser? This does the job perfectly well but drains your oxygen supply rather dramatically. Oh, by the way, I suppose they did tell you on Earth that there are funny little sprites wandering around the system which cannot be destroyed, so must simply be avoided?

At least you'll appreciate the rather nice jetpack they gave you, so that you can fly over them, although again this drains the air supply.

Still, all is not lost because there are air tanks up on the surface which you can plug into before dropping back underground to try to finish the job.

There are several screens – some with additional features like transport pads which move you quickly up and down the system's levels.

There are a couple of snags including the rather long time delay between being killed and the magical reincarnation. This is further aggravated by the fact that the monsters keep moving during this time, and have an annoying habit of being too close when you reappear!

Generally, though, this is a fairly enjoyable game with no original ideas, but plenty of excitement for the younger player.

**Phil Tayler**

| | |
|---|---|
| *Sound* | 5 |
| *Graphics* | 8 |
| *Playability* | 7 |
| *Value for money* | 8 |
| *Overall* | 7 |

*Product: Phantom Combat*
*Price: £9.95*
*Supplier: Doctor Soft, PO Box 66, East Preston, Littlehampton, West Sussex BN14 2TX. Tel: 0903 770044*

## Flying high

DOCTOR Soft's Phantom is not one of your run of the mill flight simulator programs.

The cassette carries two versions, one running in two colour Mode 4 and the other in four colour Mode 1. The former is slightly faster.

The game loads quickly, building up to comprehensive cockpit display of instruments, unique in that some information is given in analogue form as well as digital readouts.

I found that once the short but comprehensive instructions had been read and noted, flying the aircraft was a comparatively easy task.

In the training mode the scoring is inhibited and crashes at supersonic speeds into the runway are allowed.

You can have two or one joystick operation plus keyboard. I found that one joystick plus keyboard for the other controls was the best choice.

In the Form mode, which is automatically entered above 12,000 feet, the enemy aircraft are controllable from the keyboard should you desire, and can be shot down in combat or used to practise formation flying.

The combat mode does not allow target control, but the scoring is enabled and kills are logged. Should you get to the stage where your own aircraft is so badly damaged that it can no longer be flown the Escape key allows you to eject, preserving your score.

The aircraft flies true and is very manoeuvrable and the enemy a real threat, as I found to my cost shortly after starting.

Full marks to Doctor Soft. Phantom is better than I expected and well worth the money, whether you are a computer flier or an RAF pilot of the future.

**Dave Richards**

| | |
|---|---|
| *Sound* | 7 |
| *Graphics* | 8 |
| *Playability* | 9 |
| *Value for money* | 8 |
| *Overall* | 8 |

*Product: Secret Mission*
*Price: £7.95*
*Supplier: Adventure International, 85 New Summer Street, Birmingham B19 3TE*

## Toughie Adams

READERS may remember a TV program called Mission Impossible in which the leader of a government spy team always received his instructions on a tape, which after being played, self-destructed.

Secret Mission (Adventure International) is the third in the Scott Adams series of games and is based on that TV series.

You, like the leader of the spy team, have to play a tape to find out what your task is.

Your mission is to prevent the destruction of a nuclear plant. A saboteur has planted a bomb in the reactor and it is up to you to defuse it.

On playing the tape in the briefing room you discover that the saboteur has been there before you.

A quick exploration shows that you have only got access to eight locations.

Several security doors bar your way, though a visit to the grey room should give you the means of getting through one of them.

You now have a visitor's pass and a means of getting into the white room. Wait until you hear a noise though, the saboteur is suicidal and will provide vital additions to your inventory.

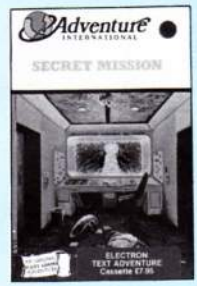
The window is now the place to go and the tape recorder will help here. You'll have to fool that camera, so think who you'd send for, here, to repair the window.

You should now have another key and a return to the console should help you to get through another door. A floor cleaner is soon found and therefore, two objects that will put you well on the way to finishing the game.

I think this is the hardest of the Scott Adams games I have tried.

An excellent adventure that I highly recommend.

**Paul Gardner**




| | |
|---|---|
| *Atmosphere* | 5 |
| *Complexity* | 7 |
| *Presentation* | 4 |
| *Value for money* | 6 |
| *Overall* | 6 |

*Product: Diamond Mine II*
*Price: £2.50*
*Supplier: Blue Ribbon Software, Silver House, Silver Street, Doncaster. Tel: 0302 21134*

## Back to the mines

ANOTHER budget label game from Blue Ribbon, Diamond Mine II not surprisingly carries on the scenario set in their earlier game.

This is – surprise, surprise – a diamond mine, but one with more to collect, more problems to overcome and quite a bit more "stickability factor".

Actually, I wasn't over-impressed for quite some time, and only came back to load it in again because I had a review to write.

Then I found I hadn't read the instructions on the cassette inlay properly.

I had been trying to guide my vacuum cleaner pipe down through the mine, collecting diamonds, but my lives went quickly because the various monsters kept touching the pipe.

Then I read that Return would retract the pipe, and the game altered completely!

It was now a frustrating but possible assignment to collect all the diamonds from one level, on occasions having to retract a long length of pipework as a monster appeared near the top of the screen.

Still, there was always the revenge of sucking it up in the vacuum for some bonus points.

The direction keys can be used in conjunction, so corners could be negotiated simply and swiftly, but that didn't make the game any easier to win.

Should the pipework clear a screen a harder mine soon appeared and after 10 such, the screens become invisible.

However, I will have to take Blue Ribbon's word for that as I've not got there yet.

But I'll keep playing until I do!

**Phil Tayler**

| | |
|---|---|
| *Sound* | 6 |
| *Graphics* | 8 |
| *Playability* | 8 |
| *Value for money* | 10 |
| *Overall* | 8 |

*Product: Frak!*
*Price: £7.90*
*Supplier: Aardvark, 100 Ardleigh Green Road, Hornchurch, Essex RM11 2LG. Tel: 04024 41918*

## Frak – it's sure to be another classic

AT last Frak is here and Electron owners need be envious no longer of their BBC Micro-owning friends.

Basically Frak, by Orlando, is a multi-screen ladders and levels game. However the superb graphics make it stand out from the crowd.

The main character, which you control, is a large caveman, complete with animal skin clothing, big belly and stubbly chin.

The aim is to collect all the objects – diamonds, keys and light bulbs – scattered about the screen. This involves climbing ropes and ladders and jumping from one platform to another.

The playing area is wider than the screen and when you get near the edge the screen scrolls rapidly sideways.

This is a hardware scroll and since the Electron can only scroll a minimum of 64 bytes at a time it's more like a jump than a scroll. However you get used to it after a few games.

If this were all you had to do it would be an easy game. But as you progress there are three types of monster to be disposed of, Scrubblies, Hooters and Poglets.

They don't move but nevertheless they get in your way.

Fortunately this caveman is rather adept with a yo-yo. Don't ask me what a caveman is doing with a yo-yo, I haven't a clue. It's useful for bopping nasties, though.

As well as bashing monsters you have to dodge balloons which float up the screen and daggers which fly diagonally down. With a bit of practise these can also be yo-yoed.

As a bonus there's a screen designer which enables you to edit any of the existing screens or completely design your own starting from scratch. You can add platforms, crystals, monsters, light bulbs and so on. It can be tested at any stage so if it's not quite right you can easily alter it. The finished screen can be saved to tape and loaded back next time.

The original BBC Frak is in Mode 1, the Electron version has been converted to Mode 4. Although it's lost a bit of colour the graphics actually seem better. The game is very slightly faster and less flickery.

Frak is one of the classics on the BBC Micro and is destined to be one of the classics on the Electron.

No games collection will be complete without it, so start saving up now.

**Roland Waddilove**

| | |
|---|---|
| *Sound* | 9 |
| *Graphics* | 10 |
| *Playability* | 10 |
| *Value for money* | 10 |
| *Overall* | 10 |

*Product: Competitive Maths*
*Price: £5.95*
*Supplier: Duckworth, The Old Piano Factory, 43 Gloucester Crescent, London NW1. Tel: 01-485 3484*

## Maths can be addictive

THIS is one of those programs you might tend to dismiss on first sight. However on persevering I became quite addicted to it.

The idea is to choose a mathematical subject out of addition, subtraction, multiplication and division. You are then asked for the level of difficulty – there are three.

Now sit back and prepare yourself for the next 60 seconds of quickfire mental arithmetic questions as the computer prepares its barrage.

I found I could cope quite well with the addition and multiplication questions, but when it came to subtraction or division I had some catching up to do.

That's where the program came into its own for me. Due to its competitive nature you feel you can't stop – not yet anyway, just got to beat that last score.

After a while the questions became easier for me and I moved to level 3. The levels of difficulty are well worked out. Each time you achieve a maximum score of 39 you move up a level.

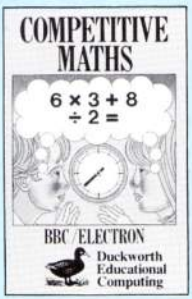
On level 3 I have as yet been unable to better my high score of 27.

One complaint I have about this program though is that in the rush to type your answer in it is often easy to hit a wrong key and this causes a point to be deducted from your score.

I suppose this helps to train your reflexes but I still found it somewhat frustrating.

This is an addictive game that is both fun and educational for children and adults alike.

**Robin Nixon**



*Product: Robin of Sherwood*
*Price: £7.95*
*Supplier: Adventure International, 85 New Summer Street, Birmingham B19 3TE*

## Superb adventure

IT isn't unusual for me to get stuck in adventures, but to do so when a cheat sheet is enclosed with the game certainly is, which goes to show the quality of Adventure International's Robin of Sherwood.

While the plot of the game is new, the characters and some of the events in it follow the recent TV series closely.

You, of course, play Robin of Locksley, the Hooded Man and your task is to find and safely store the Touchstones of Rhiannon.

You start the game in the Sheriff's dungeons awaiting trial for killing deer. Escaping is difficult and probably one of the most well constructed puzzles I have seen.

Once you are free you should save the game – exploration of the castle is risky, though necessary.

It shouldn't be too long before you manage to get out of the castle and when you do you'll find yourself in the middle of a 60-odd room maze. I suggest you save the game again at this point.

The usual maze-mapping methods won't work here as the objects you have seen so far can't be collected.

The maze is logical, though, so you can map it linearly. Moving two moves east and then two west will bring you back to your start position, providing you haven't tried to go off the map.

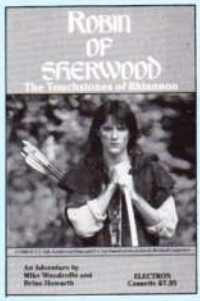
If you find you need less moves on your return journey then you have reached the edge of the map and should, by reducing the number of moves, be able to find where the edge is.

Eventually you'll manage to map it all.

I was a bit disconcerted to find myself dumped in the forest maze so suddenly, and this put me off the game for a while.

Once I had got further into it though, I found it to be one of the best adventures to have come my way for a while.

**Paul Gardner**




| | |
|---|---|
| *Atmosphere* | 6 |
| *Complexity* | 6 |
| *Presentation* | 5 |
| *Value for money* | 6 |
| *Overall* | 5 |

*Product: Chip Buster*
*Price: £7.95*
*Supplier: Software Invasion, PO Box 68, London SW19 4TX. Tel: 01-947 8876*

## Bugs have their chips

IF you've ever taken a peek inside your Electron you'll know that the insides are very complicated, with the tracks between the chips very hard to follow.

Software Invasion use this maze as the location for Chip Buster, and a very good idea it is too.

Having established this reasonable scenario they then decided to stretch our credibility a bit – the maze is infested with bugs which byte holes in the circuits.

You control a repair man whose job it is to keep the computer running. He has none of the usual tools to help him, not even a soldering iron.

In fact all he has is a large hammer, which I'd have expected to do even more damage than the bugs, but it seems to work for him.

There are three circuit boards to choose from – Electron, standard BBC and B Plus. Contrary to real life expectations, these are apparently very prone to faults.

There's no joystick option, so keys Z, X and /, : are used to move around. Press Return and the miniature electronics wizard starts hammering away to fix the holes or kill the bugs while they're chewing.

A damage report is available at any time by pressing D, and once you've figured out where each named area is you can run off to the one most in need of attention.

Should you fail in the allotted time the computer crashes and there are more bugs and invisible tracks to liven up the higher levels.

Chip Buster's sound options allow the excruciatingly awful music to be turned off.

Animation is quite good, scrolling by the screenful when you move to the edge of the screen, and the colours have been well chosen for maximum clarity on a colour TV, but are less clear on a monochrome one.

Although competently written, this is really a variation on the well worn arcade maze game theme. I was a bit disappointed that more wasn't made of a good idea.

However it is fast and fun enough to keep the youngsters amused for a while.

**Nick Rhodes**

| | |
|---|---|
| *Sound* | 2 |
| *Graphics* | 6 |
| *Playability* | 6 |
| *Value for money* | 5 |
| *Overall* | 5 |

*Product: Football Manager*
*Price: £8.95*
*Supplier: Addictive Games, 10 Albert Road, Bournemouth BH1 1BZ. Tel: 0202 296404*

## Top of the league

FOOTBALL Manager, by Addictive, has to be one of the best strategy games available for home computers.

As the manager of a football club you have to get from league division four to league division one in as few seasons as possible.

The first screen asks your name and allows you to select your team from the whole league. There seems to be little advantage in picking the well-known clubs as they are all dependent upon the skill of their manager – you.

The team you inherit is then displayed, together with six pieces of information on each player – playing position, number, skill rating, energy rating, saleable value and status (either picked or injured).

From this screen there are a number of other options affecting the game. You can get a display of your performance, beg for a loan from the bank and even pay off loans.

You can change your skill level, change the team and player names, save a game or restart a saved game.

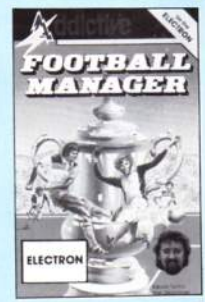
Once you have done all the housekeeping from the first menu you have an announcement of your next fixture, which might be in either League or Cup competition.

Following this there is a readout of the comparison of the teams giving ratings for energy, morale, defence, midfield and attack. This is worth careful study as it is here that you can achieve the most valuable changes by modifying your team.

Unlike the BBC version, there is no graphical display of the actual matches, but it's none the worse for that.

I doubt that this game will ever be bettered. It is all it claims to be and is very addictive to boot.

**Dave Carlos**




| | |
|---|---|
| *Sound* | 5 |
| *Graphics* | 4 |
| *Playability* | 7 |
| *Value for money* | 7 |
| *Overall* | 6 |

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# Scroll your chosen message along the bottom of your screen with this routine by STEPHEN MARTIN

**NOTICE Board is a useful program which allows a message of your choice to be scrolled along the bottom of the screen.**

The length of the message can be varied along with the speed of the scrolling and the background and foreground colours used.

The routine is in machine code with a small Basic procedure to let you pass the variables used.

The code is held in the procedure *assemble* and this should be tagged on to the end of your program. The other procedure *text*, which "prints" the message, should follow it.

To scroll a particular message across the screen you must call the procedure *text*. The syntax of this is:

```
PROCtext("message",foregrou
nd,background,speed)
```

The string "message" refers of course to the text which you wish to scroll. *foreground* and *background* refer to the colours in the scrolling window, and *speed* is the rate at which scrolling occurs.

The value of *speed* should be set to a integer greater than zero. One is the normal value, and the greater the number the slower the speed.

Although *foreground* and *background* refer to the colours the values are not the normal ones used in the COLOUR command.

The reason for this is that the program pokes the letters on to the screen instead of printing them. This is a lot faster than using the operating system's printing routines.

The values of *foreground* and *background* could be any number from 0 to 255, but most of the values would produce unreadable multi-coloured effects.

If you look at Figure I you will see the numbers which correspond to the colours in Mode 5.

Use of other values than these is only advisable if the foreground or background takes one of the values in the table.

For example, set the background colour to red and the foreground colour to any other value between 0 and 255.

| Colours | hex | decimal |
|---|---|---|
| Black | &00 | 0 |
| Red | &0F | 15 |
| Yellow | &F0 | 240 |
| White | &FF | 255 |

*Figure I: Colour Codes*

If you wish to scroll a message which is exceptionally long and will not fit into one call to PROCtext because of the restriction in length on a Basic line, you can quite easily split it into two or more calls like this:

```
10 PROCtext("A really long
message...",&FF,&F0,1)
20 PROCtext("...the rest of
the really long message.",
&FF,&F0)
```

Here's how the routine works: The machine code is in two parts. The first is the section which scrolls the window at the bottom of the screen.

The process is quite straightforward once you have studied the screen memory map. Look at Figure II and you will see that the screen is made up of a number of rows and columns, 40 columns by 32 rows to be exact. The Mode 5 screen does in fact have only 20 characters not 40, but each character is made up of two bytes making two columns for each character so 2*20=40.

To make a row of the screen scroll left it is just a matter of swapping bytes of the screen memory.

The first byte is loaded with the contents of the second byte, then the second byte is loaded with the contents of the third byte, and so on.

Lines 220 and 390 are the

Notice Bo

heart of the scrolling routine.

The second and most complicated part of the program is devoted to actually placing each row of the character on the screen.

The whole definition of the current character is discovered by calling OSWORD with A=&0A. Now for simplicity let us imagine we only wish to place the top row of the character on the screen.

Figure III represents this top row with a shaded-in block representing a 1 in binary notation.

We have to work our way along the columns 8 to 1 and each time detect if there is a block there or not.

If there is we have to place one on the screen, scroll it, then cycle back for another check. Of course in the program we are checking all eight rows and eight columns.

A slight complication arises when you realise that the computer gives us the character definition in a series of decimal numbers, not binary digits.

Of course we could convert the numbers into binary, but there is a much quicker and more elegant way of discovering whether we need to plot a block or not.

The solution is to use the logical operator AND.

The rules of AND are explained in Figure IV. It's fairly simple. AND requires two inputs, the output from an AND gate only being one if the two inputs are 1.

If we want to discover whether there is a 1 in the leftmost column of our character row in Figure III, we AND the row value with 128.

| | |
|---|---|
| | 11001000 = 200 |
| AND | 10000000 = 128 |
| | 10000000 = Result |

The result is now compared with the value you ANDed, in this case 128. If the two digits are equal then there is a 1 in the character definition.

This process is carried out for every row and column in the definition.

And that's all there is to it. All that remains is for you to incorporate it in your own programs.

| | | |
|---|---|---|
| &5800 | &5808 | &5810 |
| &5801 | &5809 | &5811 |
| &5802 | &580A | &5812 |
| &5803 | &580B | &5813 |
| &5804 | &580C | &5814 |
| &5805 | &580D | &5815 |
| &5806 | &580E | &5816 |
| &5807 | &580F | &5817 |
| &5940 | &5948 | &5950 |
| &5941 | &5949 | &5951 |

*Figure II: How the Mode 5 screen is built up*

*Figure III: A typical character row*

| INPUT 1 | INPUT 2 | OUTPUT |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 1 | 1 |

*Figure IV: How AND combines inputs*

ard...Notic

## Notice Board listing

### *From Page 17*

```
  10 REM Notice Board
  20 REM BY S.Martin
  30 REM (C) Electron User
  40 *KEY10 OLD:M
  50 ON ERROR GOTO 80
  60 *FX16,128,1
  70 ?&212=&D6:?&213=&F1:?
&2AC=0
  80 ON ERROR OFF
  90 MODE5:VDU23,1,0;0;0;0
;
 100 VDU23,255,66,60,90,25
5,129,255,126,219
 110 PROCasseable
 120 PROCtext("Notice Boar
d ",&FF,&0F,1)
 130 PROCtext("Electron ",
210,170,2)
 140 PROCtext("User    ",&
0F,&FF,3)
 150 PROCtext(STRING$(5,CH
R$255+" "),&0F,129,1)
 160 PRINT'"Press Break!"
 170 END
 180 DEFPROCasseable
 190 osbyte=!&20A AND &FFF
F
 200 DIM O% 1050
 210 FORT=0TO2STEP2
 220 P%=O%
 230 COPTT
 240 .scroll
 250 LDA&E0:STA&70
 260 LDA&74:STA&71:STA&73
 270 LDA&E8:STA&72
 280 JSRdelay
 290 LDX#7
 300 LDY#0
 310 SEI:LDA #4:.frame BIT
&FE00:BEQ frame  \+FX19
 320 .loop
 330 LDA(&72),Y:STA(&70),Y
 340 INY
 350 BNEloop
 360 LDA&70:CLC
 370 ADC#&40:STA&70
 380 BCCa1
 390 INC&71
 400 .a1
 410 INC&71
 420 LDA&70:CLC
 430 ADC#8:STA&72
 440 LDA&71:ADC#0
 450 STA&73
 460 DEX
 470 BPLloop
 480 CLI:RTS
 490 .letters
 500 LDA #return MOD256:ST
A &228:LDA #return DIV256:S
TA &229
 510 LDX#0
 520 .get
 530 LDAmessage,X
 540 CMP#13
 550 BNEnotlast
 560 CLI:RTS
 570 .notlast
 580 STX&76
 590 STAsubject
 600 LDX#subject MOD 256
 610 LDY#subject DIV 256
 620 LDA#&0A:JSR&FFF1
 630 SEI
 640 LDX&76
 650 LDA#128:STAmask
```


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```
660 .innerloop
670 LDA&&E0:STA&80
680 LDA&&75:STA&81
690 LDY#0
700 .outputrow
710 LDAinfo,Y:ANDmask
720 CMPmask
730 BNEspace
740 JSRpoke
750 JMPdoneone
760 .poke
770 STY&77
780 LDY#7
790 LDA&82
800 .poloop
810 STA(&80),Y
820 DEY
830 BPLpoloop
840 LDY&77
850 RTS
860 .space
870 STY&77
880 LDY#7
890 LDA&83
900 .sploop
910 STA(&80),Y
920 DEY
930 BPLsploop
940 LDY&77
950 .doneone
960 LDA&80
970 CLC:ADC#&40
980 STA&80
990 LDA&81:ADC#&01
1000 STA&81
1010 INY
1020 CPY#8
1030 BNEoutputrow
1040 STX&79
1050 JSRdelay
1060 JSRscroll
1070 LDX&79
1080 LDAmask
1090 LSRA:STAmask
1100 BNEinnerloop
1110 INX
1120 JMPget
1130 .delay
1140 LDY&78
1150 .dloop
1160 SEI:LDA #4:.frame BIT
&FE00:BEQ frame  \*FX19
1170 CLI:DEY
1180 BNEdloop
1190 .return RTS
1200 .subject
1210 NOP
1220 .info
1230 NOP:NOP
1240 NOP:NOP
1250 NOP:NOP
1260 NOP:NOP
1270 NOP
1280 .mask
1290 NOP
1300 .message
1310 RTS
1320 ]:NEXT:ENDPROC
1330 DEFPROCtext(A$,fX,bX,
dX):IFdX(1:ENDPROC ELSE ?&7
8=dX:?&82=fX:?&83=bX:$&messa
ge=A$:CALLletters:ENDPROC
```

***This listing is included in this month's cassette tape offer. See order form on Page 61.***


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Electron User October 1985.

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**IN the last two articles we've used Osword &72 to access the 1770 Floppy Disc Controller (FDC) directly. This enabled us to write a fast backup utility and sector editor.**

Now we'll use Osword &72 to recover lost files and write a disc search utility.

It's quite easy to delete a file on disc accidentally – every disc user has done it at one time or another.

It can happen when using commands that use wild cards, for instance:

```
*DESTROY Prog*
```

would destroy all programs beginning with the letters Prog.

When backing up discs have you ever muddled up the source and destination discs?

Or taken a disc out before the red light has gone off and written the directory of one disc to the next disc you put in?

That is fatal – you lose everything. But don't despair, everything is not lost. The files can be recovered.

Unlike tape, when a file on a disc is deleted it is not erased or wiped from the disc, it's still there. You can confirm this by saving a file to disc and then *DESTROYing it.

Use the sector editor from last time to examine the disc. Typing in:

```
*INFO prognaae
```

before deleting the file will tell you the disc address where the program is stored – it's the last number printed.

You'll see that it's still there although *CAT will tell you otherwise, and if you try to load it you'll get the "Not found" message.

As you know, a directory contains a list of files on the disc. When a file is *DELETEd or *DESTROYed it is simply removed from the list. If it's not on the list in the directory then the ADFS thinks that it's not on the disc.

But, as we've seen, it is still there, so how can we recover it? The answer is to use Osword &72 to load directly from the disc the sectors in which the program is stored.

We need to know at which sector the file starts and how many sectors it covers.

The sector editor could be used for this, but trying to find a 1k program on a disc with 320k of storage space would be like trying to find the proverbial needle in a haystack. You can do it, but it would take a long time.

What we need it a utility to search the disc for the file.

Take a look at Program I, Disc Search, which searches the contents of the disc for an Ascii string.

Osword &72 is used by PROCsector to load each sector one by one into RAM. &C00 is a convenient place since we aren't defining any characters.

A search for the string is then carried out by PROC-search. The sector currently being looked at is printed, and if there's a match the disc address is printed.

What string should you search for? I always put the title of a Basic program in a REM statement at the start, usually in line 10.

In order to find where Program I is on my disc I would search for the string "Disc Search" or maybe even "R.A. Waddilove".

Note, however, that Basic keywords such as REM are stored as tokens, not Ascii characters, so don't include REM itself in the search string.

You may have noticed when examining discs using the sector editor that pro-

```
  10 REM Disc Search
  20 REM By R.A.Waddilove
  30 REM (c) Electron User
  40 MODE 6
  50 *MOUNT
  60 *FX16
  70 FDC=&900
  80 INPUT LINE"String ";
a$
  90 B%=ASC(a$)
 100 FOR I%=0 TO &4FF
 110 PRINT "&";~I%;CHR$13;
 120 PROCsector
 130 PROCsearch
 140 NEXT
 150 PRINT "Finished!"
 160 END
 170
 180 DEF PROCsector
 190 ?FDC=8
 200 FDC!1=&C00
 210 FDC?5=&08
 220 FDC?6=I% DIV&10000:FD
C?7=(I% DIV &100)AND &FF:FD
C?8=I% AND &FF
 230 FDC?9=1
 240 A%=&72:Y%=FDC DIV 256
:X%=FDC MOD 256:CALL &FFF1
 250 IF ?FDC>0 PRINT "Disc
 Error at &";~I%
 260 ENDPROC
 270
 280 DEF PROCsearch
 290 FOR A%=&C00 TO &D00-L
EN(a$)
 300 IF ?A%=B% PROCtest
 310 NEXT
 320 ENDPROC
 330
 340 DEF PROCtest
 350 match=TRUE
 360 FOR C%=0 TO LEN(a$)-1
 370 IF A%?C%<>ASC(MID$(a$
,C%+1)) match=FALSE
 380 NEXT
 390 IF match PRINT "&";~I
%;" ";a$
 400 ENDPROC
```

*Program I*

grams are always stored starting at the beginning of a sector. They never start half way through.

Since the title in Program I is at the start of the program, in the first 30 or 40 bytes, we could restrict the search. Line 209 could be altered to:

```
290 FOR A%=&C00 TO &C20
```

This would make it much faster.

Having found the address of our lost file Program II, Recover, loads it into RAM. Osword &72 is used as before.

Line 100 sets the load address to &2000 and line 130 tells the 1770 FDC to load 64 sectors (64 sectors is 16k, which should be enough for most programs).

If it's a Basic program, after loading set HIMEM to &6000, PAGE to &2000 and type OLD. If you're lucky the program will be intact and can be saved to another disc.

If you're not so lucky the program will be corrupted and you'll get "Bad program". If this happens enter:

```
!TOP=&FF8D
```

This is a "Bad program" fix, and recovers as much of the program as possible.

The same technique can be used for machine code, data or spooled files and not just Basic programs.

With a machine code program there might not be a suitable Ascii string to search for. I'll leave it to you to modify the input to accept a series of hex numbers instead of a string.

Alternatively, if you wanted to search for the sequence &AB, &CD, &EF you could simply change line 80 in Program I to:

```
80a$=CHR$(&AB)+CHR$(&CD)+CHR$(&EF)
```

After recovering the file you'll need to *SAVE it to another disc.

Remember that these are powerful tools, so experiment with a disc which has nothing valuable on until you are sure the programs are working correctly.

There's no need to despair when you lose a file now. With a bit of luck, and these two utilities, you can recover it.

```
 10 REM Recover                 120 ?FDC=8
 20 REM By R.A.Waddilove        130 FDC!1=&2000
 30 REM (c) Electron User       140 FDC?5=&00
 40 MODE 6:HIMEM=&2000          150 FDC?6=A% DIV&10000:FD
 50 *MOUNT                     C?7=(A% DIV &100)AND &FF:FD
 60 FDC=&900                   C?8=A% AND &FF
 70 INPUT'"Disc address=&       160 FDC?9=64
"a$                             170 A%=&72:Y%=FDC DIV 256
 80 A%=EVAL("&"+a$)MOD&50      :X%=FDC MOD 256:CALL &FFF1
0
```

*Program II*


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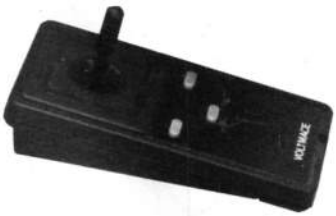

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# Reaching the point of no Return

**AT this stage in our course on Basic Program I should give you no problems.**

As you can see the program asks you to give it a letter from the keyboard (line 20) and the next line stores it in the string variable *letter$*. Line 40 just tells you what you entered, in case you'd forgotten.

It's a fairly trivial program but it does have some interesting points.

Note that although we say it accepts a letter from the keyboard in fact you have to give it a letter and then press Return before the program will accept it.

This is because when you press a key the letter on that key, or rather its code enters a special bit of memory known as the keyboard buffer.

You can look on this as a sort of notepad that keeps track of what you've typed in. The Electron doesn't take notice of what's in the buffer until Return is pressed. Hence you always have to finish a line by pressing Return.

With Program I it's quite possible that there might be more than one letter in the buffer when you press Return. So which letter did you mean?

In this case it doesn't matter, *letter$* will quite happily hold more than one character.

However, if you were using it in a more complicated program you might be testing *letter$* to decide on a course of action and if your program assumes that it only has one letter when in fact it may have more, you've got problems.

So using INPUT to read a single letter off the keyboard has its drawbacks. You have to press Return and you may get more letters than you bargain for. Also the program stops dead until you give it something to satisfy the input.

Program II uses the function GET$ to solve some of these problems. GET$ looks at the keyboard buffer, takes the first character it finds there and stores it in a string variable for later use.

There's no need to press Return to alert the micro to the fact that you've typed something in. With GET$ all you have to do is press the key. You've reached the point of no Return.

```
10 REM Program I
20 PRINT "Give me a
letter"
30 INPUT letter$
40 PRINT "You gave me
the letter ";letter$
```

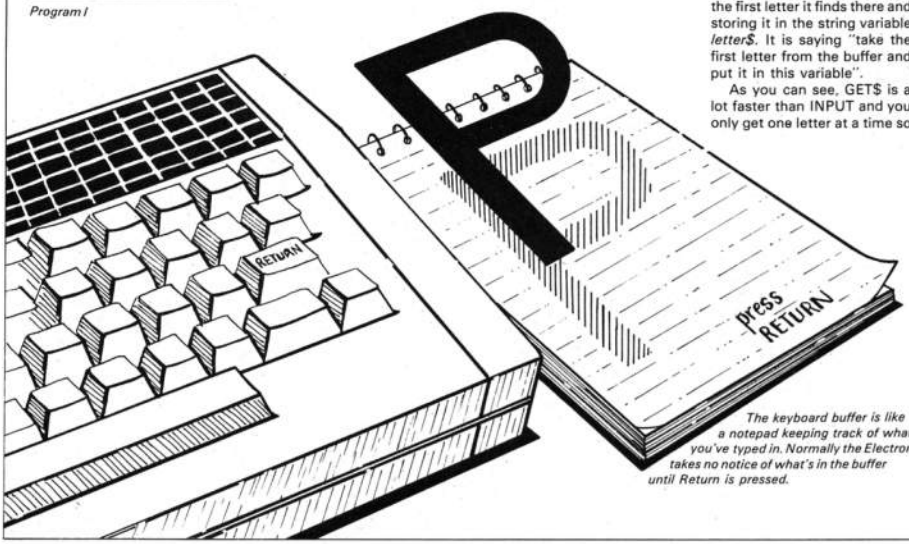
*Program I*

```
10 REM Program II
20 PRINT "Give me a
letter"
30 letter$=GET$
40 PRINT "You gave me
the letter ";letter$
```

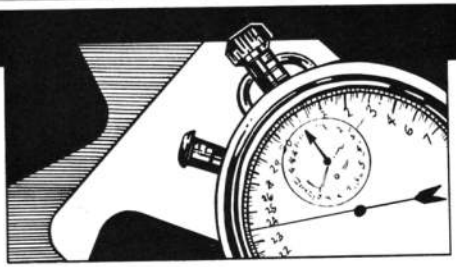
*Program II*

Line 30 is the important one. This has the Electron looking at the buffer, taking the first letter it finds there and storing it in the string variable *letter$*. It is saying "take the first letter from the buffer and put it in this variable".

As you can see, GET$ is a lot faster than INPUT and you only get one letter at a time so




*The keyboard buffer is like a notepad keeping track of what you've typed in. Normally the Electron takes no notice of what's in the buffer until Return is pressed.*



# PETE BIBBY examines the way the keyboard buffer can be manipulated

it's great for collecting the answers to lines like:

```
PRINT "Want another go?
Y/N"
```

GET$ has a related function, GET. This works in the same way, looking at the first letter in the keyboard buffer and storing it in a variable. However instead of storing the letter itself into a string variable GET stores the Ascii code of the letter in a numeric variable. Program III shows it in action.

```
  10 REM Program III
  20 PRINT "Give me a
letter"
  30 letter=GET
  40 PRINT "You gave me
the letter ";CHR$(letter)
```

*Program III*

It's much the same as the previous program except that *letter* is now used to hold the information dragged from the keyboard buffer.

Notice how we have to use the CHR$ function to translate from the Ascii in line 40. Otherwise we'd just have a fairly meaningless number.

At first GET seems to be less useful than GET$ as you nearly always want a letter from the keyboard rather than its Ascii number. However it does have its uses, as you'll see when you run Program IV.

```
  10 REM Program IV
  20 PRINT "Give me a
letter"
  30 letter=GET
  40 IF letter>96 THEN
letter=letter-32
  50 PRINT "You gave me
the letter ";CHR$(letter)
```

*Program IV*

The aim of this program is to take a letter from the keyboard and display it in uppercase. In other words, if you enter e the program changes it to E before displaying it.

Once you know that the Ascii code of a lowercase letter is 32 more than that of the corresponding uppercase letter then line 40 should hold no fears for you.

One of the problems with both GET and GET$ is that it takes the first letter from the keyboard buffer and sometimes this isn't the one you want. Often it contains left over letters from a previous part of the program.

You've probably come across this in a poorly written game where you've been frantically pounding the X and Z keys to move your laser. Your last life is lost and you're asked:

```
"Want another go? Y/N"
```

but before you can answer the game's over and a lot of Zs and Xs appear next to the prompt.

The keyboard buffer strikes again. It was full of unused Xs and Zs so your Y or N never got to the front of the queue.

The moral is that if you're going to look at the keyboard buffer make sure the letter you want is at the front. You do this by flushing the buffer with the operating system command:

```
*FX21,0
```

This gets rid of everything in the buffer, so if you use it just before a GET or GET$ then you know you'll get the correct letter. In the case of the last two programs:

```
25 *FX21,0
```

does the trick. So the rule is flush your buffer before you use GET or GET$.

While using GET and GET$ solves the problem of getting a letter from a keyboard without having to press Return they still cause the program to halt. if you don't give it anything it just waits expectantly.

In fact one of the main uses of GET is to halt a program until the user presses a key to say he's ready for the next bit. The lines:

```
*FX21,0
PRINT "Press a key when
ready"
wait=GET
```

will stop the program until a key is pressed. As wait isn't needed, it doesn't matter what key is pressed. Here GET is just used as a brake while wait is a dummy.

Useful as GET$ and GET are, they have their limitations. Sometimes you just want a program to take a peek at the keyboard and if there's nothing doing to get on with the job rather than hang around.

One example of this is a loop which you want to go on looping until the user presses N. Obviously you don't want it to grind to a halt everytime it gets to a line like:

```
IF GET$="N" THEN ...
```

The answer lies in the functions INKEY() and INKEY$(). These act just like GET and GET$ except that they have a built-in time limit in the form of a figure in brackets following them.

This figure decides how long the program will wait for a letter to be entered into the keyboard buffer – assuming that there isn't one already lurking there.

Once the specified time period is exceeded the program carries on from the next line. It signals what it's done by having INKEY() return –1 and INKEY$() return the null or empty string.

The parameter in brackets is measured in hundredths of a second.

Program V shows INKEY$() being used with a delay of one second (100 hundredths). If you manage to give it a letter inside one second then this is stored in *letter$*.

Should the time limit be exceeded our impatient program shows its displeasure by shoving the null string into *letter$* and going onto the next line. This prints out one of two messages as appropriate.

```
  10 REM Program V
  20 PRINT "Give me a
letter"
  30 letter$=INKEY$(100)
  40 IF letter$="" THEN
PRINT "You were too slow"
ELSE PRINT "You gave me the
letter ";letter$
```

*Program V*

The use of INKEY() is shown in Program VI.

```
  10 REM Program VI
  20 PRINT "Give me a
letter"
  30 letter=INKEY(50)
  40 IF letter=-1 THEN
PRINT "You were too slow"
ELSE PRINT "You gave me the
letter ";CHR$(letter)
```

*Program VI*

Here the delay is half a second. If there's been no response to the prompt by then, –1 is stored in *letter*. Line 40 prints the relevant message, with CHR$ again being used to translate from the Ascii.

Like GET, INKEY() tends to be used with a dummy variable to make a program wait until a key has been pressed. However, because of the time parameter it is much more useful, allowing an upper limit to the delay.

That's where we'll leave INKEY() for the time being. It does have another use but that's for next time when we'll also be taking a look at the @% which we met last month.

# TYPE CASTINGS

**ALAN McLACHLAN takes a light-hearted look at the folk who type in listings . . . and the problems that beset them**

**YOU know folks, one of the most entertaining times of the day in the editorial office is the morning mail session.**

To the accompaniment of the sparrows coughing outside, we do a quick scan of your letters, separating them into categories such as Micro Messages, submissions for publication, comments and suggestions and listing queries.

This is done so that later, when everybody has come down off the ceiling and Roland's finished oggling the Sun, the team can tackle the letters together.

During the last few months we've received sackfuls of mail on all sorts of topics.

Particularly enjoyable are those that praise the magazine content, those that offer constructive criticism and suggestions for improvement, and in particular those that contain praise for the games written by amateurs not on our staff – as opposed to the amateurs on the staff.

Queries from people who have typed in listings incorrectly and can't get the programs to run have introduced a host of wonderful characters whose existence we've never suspected.

I'd like to introduce you to some of them by quoting short sections from letters, and if on reading them you recognise yourself, please don't take offence, as none is intended.

The first character is the *chess player:* "I always check everything thoroughly. I've checked and double checked but . . ."

A variant is the *railway employee:* "I've checked every line and there isn't a single fault to be seen".

Our favourite is the *typist:* "As I have years of experience using a typewriter the chance of any errors being mine are exstreamly unlikely".

That one's followed closely by the *postman:* "I've checked every single letter and I can't find anything wrong".

More dubious is the *pot smoker:* "I've passed it around among my friends and they all agree there's nothing wrong with it".

Rather more serious is the *doting parent:* "I got my Johnny an Electron for his birthday and he had a lot of fun with it until he typed in your Skramble.

"He spent hours typing it in and it's not fair as he cannot get it to work. There must be a mistake in it as it keeps coming up Syntax Error all over the place".

He's the one who says everyone is out of step but our Johnny.

A similar case is the *ice skater:* "I've been backwards and forwards over it till I'm blue.in the face, and I'm still no further".

And of course, the inevitable *accuser:* "Having tried all weekend to get your program to run, I'm sure you put deliberate errors in to make people buy your monthly tapes".

A more dreaded character is the *improver:* "Your program does not work properly. The following additions will stop the manic mole going outside the maze". (It never did on our original version, but you try convincing him.)

As a Spielberg freak the editor is fond of the *film fan:* "We've searched high and low for Gremlins but can't find any. They seem to be hidden away in the listing and we're just not good enough to find them".

Of course there's the *happy family:* "We are not normally the types to complain, but all we have is 'Arguments' all over the place".

We all like the *Rentokill man:* "I've got rid of all my bugs but I think you must still have some, but I can't find them", and the *motor maniac:* "I've run over it time and time again and I'm sure I'm right".

These are closely rivalled by the members of the *search party:* "We've checked every entry and there's nothing unusual to be seen", and the more evil *masochist:* "I've made a painstaking check of my listing and can only assume yours to be in error".

There's the *out of work G.P.:* "I must admit I have run out of patience" (think about it) and the *racing driver:* "I've been through it time and time again and it's driving me round the bend".

Saddest is the *Optimist:* "I have been told by your telephone receptionist to write in as I am desperate. I have typed in four of your games and can't get any of them to work.

"I have saved them all on this cassette so that you can look at them for me and find out where I've gone wrong. I am an absolute beginner and don't know where to start looking for errors".

There was also a letter from one irate young chap that read something like this: "I typed in your listing of Skramble and got 'Syntax error at 550'. So I deleted that line and got 'Syntax error at 560'. So I deleted that. Now the program won't run at all. I wish you'd check these things before you publish them".

And another that contained: "I then tried Bounce Ball which took me four hours to type in (two fingers). When I came to run it the computer did not seem to like the term PROC in any shape or form. When I took them out the program would not run past line 240. Have you tried the game before publishing it?" Really, I ask you!

At least the optimist admitted that the faults were probably hers. Unfortunately, we just don't have the time to provide a debugging service and certainly not over the phone.

Out of curiosity I took this particular cassette home one weekend and found in the four programs no less than 47 typing errors and four missing lines.

It took me 10 hours looking carefully through the listings and checking every entry against that in the magazine. Apart from four errors which I couldn't find without some useful debugging techniques, all the mistakes were plainly visible.

OK I agree that to an

experienced eye they will be more obvious than to an inexperienced one, but they were there to be spotted with careful scrutiny.

I'm not going to keep the debugging techniques to myself and intend, with the assistance of the rest of the lads, to write a couple of articles on hints and tips to help you find your own programming errors.

Here's an example to be going on with. I've picked a short simple line for a demonstration, but the trick will work with much longer, more complicated ones.

Let's assume you've typed in Manic Mole from the July issue, and instead of the correct version of line 1680 which reads:

```
1680 PRINTTAB(15,29)"Press
SPACE":REPEATUNTILGET=32:
CLS
```

you have typed in, incorrectly I might add:

```
1680 PRINTTAB (15,29)"Press
SPACE":REPEATUNTILGET=32:
CLS
```

Your micro will respond with the message 'No such variable at line 1680'. If you don't know what you are looking for, finding the mistake which has prompted this message can be a pain.

You can make the debugging job that little bit easier by splitting the line at one of the colons. We'll split it at the second, but on a longer line you would find it better to split it near the middle.

Put the Basic statements in the second half of the line on a separate line, as follows:

```
1680 PRINTTAB (15,29)"Press
SPACE":REPEATUNTILGET=32
1685 CLS
```

You will still get the error message 'No such variable at line 1680'. Now split that line and make a new one from the second half and you will have:

```
1680 PRINTTAB (15,29)"Press
SPACE"
1681 REPEATUNTILGET=32
1685 CLS
```

The resulting error message will still be the same but look how we've narrowed it down to just a few characters.

Gradual elimination will leave you with the offending

statement on its own. Your micro can't tell you exactly what is wrong with it but with careful checking and perhaps experiment you should come up with the solution.

By the way, the cause of the error in the example, was the space between the TAB command and the first bracket.

The Electron saw the word TAB separated from its bracket and took it as an undefined variable.

You may have been able to spot this one straight off if you're quite good at finding your own mistakes, but imagine if the line had been a very long multi-statement one and the error had been really obscure.

This is a fairly easy technique which can be used for many error messages. We'll look at some more another time.

By the way, if all your debugging sessions have failed and you have been the postman, the pot smoker, the ice skater and any other of our friends, then drop us a line with details of the problem and any relevant error messages.

But a few words of advice:

- Don't expect an immediate reply. We're as fast as we can be, but we are snowed under.
- Do include a self-addressed envelope complete with a stamp.
- We just don't have time to debug cassettes.

We can't promise to solve all your problems, but we try our best or at least admit defeat. The request for an sae also applies to any other type of mail if you want a personal reply.

Well that's it. I'm going to get some practice now at finding some of your errors, which are amazingly like my own. I'll put some of the techniques into practice in another session.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# The WP system with some tricks up its sleeve

*Product: Starword (16k ROM)*
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**STARWORD is a powerful ROM-based word processor from Slogger. To use it you'll need either Slogger's Rombox or some other expansion which enables ROMs to be plugged in.**

Its 16k of software has been designed specifically for the Electron – it is not an adapted BBC ROM.

On power up or after Ctrl+Break you're straight into Starword in 80 column mode. It's basically the same format as Acornsoft's View.

I found it a little hard to get started at first but after a while things began to get easier.

It's probably the fact that I use View so much and have got used to using that rather than there being any question of Starword being difficult to use.

There are two modes, command and edit. In the first you can enter commands such as LOAD, SAVE and so on. Text is entered in edit mode.

Text in the default 80 column mode is rather hard to see as I don't have a monitor and resolution is not too good on my colour TV. However this is simply solved – 40 column mode is accessed by typing in 40 while in command mode.

This appears at first to be the normal run of the mill word processor, but Starword has up its sleeve some rather unusual tricks.

For instance it has the ability to personalise a standard letter to all those names entered into a mailing list file, each letter then being headed and printed for each name in the file.

It works well with all sizes of documents and enables short documents to be merged in the form of a long report or letter.

Conversely, when dealing with extra large documents Starword can split the text into several smaller chunks. The PRINT command can be followed by a list of filenames which enables the files to be printed as one document.

Disc users have an even greater advantage, as they can process the document continuously. You select this with the Edit command, specifying an input and output file.

The first batch of text can be read in and edited. Typing MORE saves the current text and reads the next chunk into memory, and so on.

Starword comes with a very comprehensive instruction manual. It is good, but takes a lot of reading. I found it difficult to remember all the commands at first, so keep the manual to hand.

The first section of the manual is for anyone completely new to the world of computers and word processors, which to me is a good attribute.

You can miss out the first couple of sections if you're conversant with ROMs and computers and move on to the excellent tutorial.

This takes you on a guided tour of the commands, control keys and functions, vital in making best use of Starword.

Because it's so close to the cursor keys Break has been protected. When pressed you are asked if you want to restore the old text.

Escape toggles between command and edit mode. In command mode there are around 26 commands, plus access to the operating system and other ROMs through star commands.

NEW clears all text, as does LOAD, whereas SAVE saves the text. It can also be SPOOLed or PRINTed. The colour of the text is easily selected with COLOUR.

Tabs can be set and the left and right margins defined. There are global and selective search and replace functions.

In edit mode word wrap is automatic and text can be entered in insert or overwrite mode with justification and formatting off or on.

A ruler shows the width of the text currently being edited, which can be up to 132 characters wide.

The screen display is a window on the text and can be scrolled up, down left or right. The cursor can be moved a character, word, line or screen at a time.

At the bottom of the screen there is a text window where all messages are displayed.

At the top is the cursor column number, ruler and status such as format details.

Headers and footers can be defined, plus their margins from the page top or bottom and text. It even allows two sided documents, such as the pages in a book, to be written.

**By DAVID RICHARDS**

When this function is enabled the headers and footers are swapped from left to right and space is left for the binding at the correct side of the page.

Blocks can be defined which can then be moved, deleted, copied, saved, loaded, formatted and so on. Cut and paste is quite easy.

The function keys have been defined to enable the more commonly used commands to be called without too many keystrokes. These may be programmed with your own definitions.

Starword allows the style of text to be altered by inserting printer control codes into the text.

The default printer driver is for Epson compatible printers. Other drivers are available and can be created with Slogger's printer driver generator ROM, designed specifically for Starword.

Multiple copies of the document can be printed, and you can specify the page to start at and the page to end. One document can be printed while another is currently in memory.

I think this is an excellent word processor for the home business or semi-professional user. It is a very powerful tool providing nearly all the features of larger professional word processors.

I would dearly have loved to have this one available earlier on in the Electron's career – this sort of quality software has been too long a time in appearing for the Electron.

I will definitely be using Slogger's Starword in the future. For a start, I'll use it in my capacity as secretary of a local club to produce letters to all the members which previously took a long time. I'm busy making a mailing file up now.

At long last the software/hardware makers are waking up to the potential of the Electron as a serious computer. This can only benefit both themselves and the user.

If you are looking for a comprehensive and powerful word processor then this one from Slogger must be given very serious consideration. It is certainly the most powerful one currently available for the Electron.

# Notebook

## Get to know recursion backwards...

**IF you can cast your mind back to the October 1984 issue of *Electron User*, you may remember the Palindrome tester. It was a program that used MID$ to reverse a string and see if it read the same backwards as forwards. This month's program also reverses a string, but now the method used is recursion.**

### PROGRAM NOTES

**30** The string to be reversed is held in the string variable *mirror$*.

**40** This line calls PROCreverse, the procedure that does the reversing. The *mirror$* in brackets after the procedure name tells the procedure which string to reverse. It's known as the parameter that's passed to the procedure.

**50** Displays the result of the reversing.

**60** Stops the program running on into the procedure definitions.

**70,130** Form the boundaries of the lines that make up the procedure. Notice that in the definition the procedure name is PROCreverse(word$). The parameter *word$* is used throughout the procedure definition. However, when it is called with PROCreverse(mirror$), the string held in *mirror$* is used wherever *word$* occurs.

**80** The variables *length* and *letter$* are declared local to the procedure. This means that the same variable names can be used as the procedure is called again and again, without them interfering with each other. Don't worry how it's done, the Electron keeps track of things. Try leaving this line out and see the chaos that ensues.

**90** Stores the length of the string *word$* in the local variable *length*.

**100** Takes one letter from the left side of *word$* and stores it in *letter$*. This is akin to making a note of the money in the box.

**110** Does one of two things. If *word$* is only one character long, *reverse$* (which will eventually hold the reverse of *mirror$*) is set to the null string. This corresponds to finding no more boxes to open. However if *word$* is longer than one character then the RIGHT$ reduces *word$* to what is left after *letter$* is removed and then calls the procedure again. This is like finding another box and going on to open it. Notice that the program goes on calling the same procedure (which does the same job each time but with a different parameter) until the parameter is one character long. It doesn't get to the next line until this condition is satisfied and all the procedures start "unwinding". The first time round **recursion** is obviously more than one character, so **r** is taken off it and the procedure called again with **ecursion** as its parameter. This is still longer than one character, so **e** is split off and the procedure called again using **cursion.** This carries on until the final **n** when the program stops calling procedures and at last gets to the next line.

**120** Now comes the bit that corresponds to the totting up of the numbers. As each procedure comes to an end each letter that has been separated in that particular procedure is added to the end of *reverse$*. Try adding:

```
115 PRINT letter$
```

to see how this happens.

**130** Ends the procedure, sending the Electron back to the program line following the one that called it.

If you add the following lines to the program, you may get a better idea of what's happening:

```
  25 count=9
  26 MODE 0
 125 PRINT "Procedure call ";count;"
adds "letter$" to make reverse$ contain
"reverse$
 126 IF count<>1 THEN PRINT "NEXT:"
ELSE PRINT
 127  count=count-1
```

## From Page 27

**SUPPOSE** someone gave you a box and said that inside it were a number of smaller boxes, one contained within the other like a Russian doll. As well as the smaller box, each box also holds some money. Your job is to find the total of money in all the boxes. How would you go about it?

One way is to open the outside box, make a note of the money found there, open the smaller box, make a note of the money in that, open the still smaller box you find with that money, make a note of the cash you find in that and so on. You carry on until there are no boxes left unopened and then add up all the figures you had noted as the process proceeded.

Notice that you can't figure out the total until every box has been opened. Only when the condition that there are no more boxes to be opened is true can you be sure that you've got all the sums of money to be added together.

This method of repeating the same actions over and over until a finishing condition and then going backwards using the results from each successive step is called recursion. And it's a lot easier to use than to explain!

```
10 REM Recursion backwar
ds
20 REM TREVOR ROBERTS
30 mirror$="recursion"
40 PROCreverse(mirror$)
50 PRINT "The reverse of
 "mirror$" is "reverse$
60 END
70 DEF PROCreverse(word$
)
80 LOCAL letter$,length
90 length=LEN(word$)
100 letter$=LEFT$(word$,1
)
110 IF length=1 THEN reve
rse$=" ELSE word$=RIGHT$(w
ord$,length-1):PROCreverse(
word$)
120 reverse$=reverse$+let
ter$
130 ENDPROC
```

string to be reversed

procedure call

stops procedures clashing

strips off one letter from word$

takes length of string

calls procedure if string is more than one character

collects the letters as the procedures each finish in turn.

Trevor Roberts

# Look out for Orbs of Aalinor

**GOOD news this month is that *Potter Programs* is to release a new machine code adventure called Orbs of Aalinor.**

Potter is well known for the value for money its programs offer and Alan Potter tells me that this new adventure is extremely difficult. Look out for it.

I'm sure many of you have at one time or another come across an adventure that you simply can't stop playing, I certainly have.

The most recent one for me has been ***Woodbury End,*** from Shards. I have had it in for review for a few months now, and I still haven't cracked it.

I keep thinking I'll just solve the latest problem and then review it. Problem is (sorry!) that I keep coming across more problems.

Now Shards has let me know that it has been cracked – twice. Regular readers will have seen H. Bastien's name appear quite frequently in these pages and he is one of the people who've done it.

Until I can crack it personally I'll give you a brief synopsis of the game.

Aliens take over a country town and adopt human form to make themselves indistinguishable from the real inhabitants.

Twenty years pass, and the children of the town begin to act strangely. Can you identify and deal with the aliens and save the children from a ghastly fate?

The cassette cover shows a specially commissioned picture of Woodbury End and the first 50 purchasers to solve the game will receive prints of this picture – which means there are 48 prints left to win.

So far I have found it to be extremely devious and the kind that I keep coming back to.

In my opinion it is one of the best three adventures available on the Electron at the moment and I highly recommend it.

I have been asked to explain why I refer to Scott Adams games when they are from Adventure International. The first adventures were written by Scott Adams and he set up his own company, Adventure International, to market them.

There are a whole series of games written by Scott, but also some written by programmers in his company.

Games like Gremlins and Robin Hood are company-produced, so I tend to classify them separately from Scott Adams' games. I hope this clarifies things.

I have been taken to task for a couple of things this month.

Firstly, I'm sure you all spotted the mistake I made in February's column. Well for once it wasn't my mistake. One of the proof readers, on reading my little pun about the food, assumed I had misspelt stake! My apologies once again, I'll get it right soon.

David Hiddart thinks I shouldn't give answers for readers who write in with problems for adventures that are only available on the BBC Micro.

All Electron adventures, except for ***Rick Hanson*** from Robico, another brilliant game, which pokes the Electron's screen memory, will work on the BBC Micro, as we all know.

However the reverse isn't true, but BBC owners don't seem to know this. I don't want to discriminate against them for not buying the best computer on the market, so I try to answer their questions.

Anyway, there isn't a column like ours for them, so I take pity on them.

Incidentally, David also asks whether I will do a special on ***Wheel of Fortune.*** There is one in the pipeline, so watch out for it.

*Extremely devious – and I still cannot crack it!*

Nick Southgate wants to know why I haven't mentioned that he sent me the solution to the anagram in ***Sphinx Adventure.*** I get hundreds of letters each month and try to pick out things from them that I think are interesting but only when they haven't been mentioned recently.

For instance, until I did the Sphinx special I regularly got about 50 letters a month asking the way to the vampire's castle. You'd all get fed up if I put that in every month, wouldn't you?

When readers send in answers to problems, such as the anagram, I tend to give the names of the first few, otherwise I'd end up, in this case, listing about 80 names.

I tend to assume that everybody is dedicated to computing in general and adventures in particular and I try to put in things that haven't been mentioned before because I assume everyone has got all the back issues of *Electron User.* If you haven't, it serves you right!

However, every letter I get with an SAE is answered, and I guarantee that. So, are you happy with the way I run this column?

It is your column after all, so write and let me know what you think.

I'd also like to know what you think about a compilation of all my columns to date with some maps and solutions added.

Right, enough trumpet blowing. Thanks are due this

→

*From Page 29*

month to Nick Southgate, for a complete solution to ***Galadriel in Distress,*** G. Ward for a belated but welcome solution to ***Sphinx Adventure,*** Paul Taylor for his cheat-sheets for ***Hampstead*** and ***Crown Jewels*** and K. Schadewald for his solution to ***Greedy Dwarf.***

Robert Henderson has written in to explain how Sphinx Adventure can be listed. Load in the machine code "Bad program" fixer from the

December issue and then CHAIN Sphinx as usual.

When it has loaded, press Ctrl+V, then 6 and then type CALL &D01. The game can then be listed, and since it is in Basic, a save-game routine can be added.

Robert also points out that you can go to any part of the game by changing the value of PROC(L) to the line number of the location you want.

This is an excellent tip, and if Robert sends me in a list of his adventures I will send him a tape. If anyone can improve on Robert's idea by incorporating a save-game routine and producing a working version with it in, I will reward them with a tape too. But don't forget that list of adventures.

## PROBLEM CORNER

Russell Blake – thanks for the ***Gremlins*** tips – is having problems with ***Quest for the Holy Grail.*** He has chopped the tree down and cut it up to make the logs, but cannot make the raft. You need half the rope to tie the logs together.

He is also stuck in ***Fantasia Diamond*** and ***Secret Mission.*** In the first, to get through the trapdoor keep hitting it. In the latter, you can't get through a second window.

Christopher Lowe, Martin Haig and Patrick Ball are all having trouble with ***Adventure.*** Water the plant to reach new heights.

Bread, what bread? The diamond is up that plant. To get into the dungeon and get the last treasure, go into the desert and, providing you have the keys, drop one of your treasures and then "steal" it back.

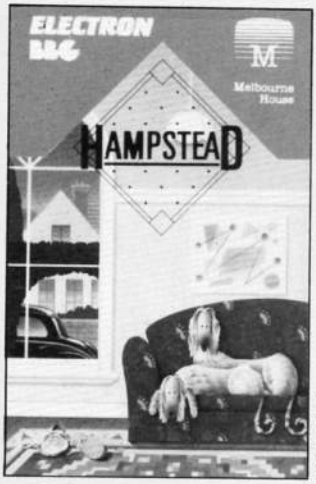
Say OPEN SESAME to get into the caverns. The slipper is a red herring and, for John Tipper, a red herring is an object that is meant to look useful but which plays no part at all in the game.

***Hampstead*** is popular this month. Perry Spencer wants to know if the china dogs and lathe bracket are used (not as far as I know, and yes) and how do you meet the man on the train – wear, read and carry something a bit more up-market (the bracket will help).

Jonathan Caslake wants to know how to open the filing cabinet. Use something in a desk in the department store.

Nick Southgate wants to know how to avoid having your pockets picked. Don't go there!

Derek Willoughby says that my advice to see chubby doesn't work. It does if you have done everything you should have!




*Don't go here if you want to avoid having your pockets picked!*

Richard Jay insists that the Hampstead hintsheet says that you need the Sony Walkman. It doesn't. Try reading a magazine.

Junior Lumsden's younger brother (sic) wants to know how to get money and how to get on the train. Cash your giro and rest a while in the park. Buy a ticket.

Simon Stead and Susan Parsons have both written in about ***Dracula Island.*** To open the coffin you must use the hammer.

Use what you find to get past the native and you'll also find the answer to the door in the courtyard.

Simon Stead is also stuck in ***Ring of Time.*** You need a sword to kill the mad monk and once you have done this you will find the rope.

The combination is on the parchment, so it's not a red herring. Watch out though, the parchment is used twice.

***Castle Quest,*** a BBC game, has Trevor Gonsalves puzzled. To finish the game, find the two patrolling guards near the troll. Get past them and throw the wand to the right.

Positioning is critical, so you will have to keep trying until you get it right.

Simon Stead, S.D. Webb and Harvey Reynolds are stuck in ***Pyramid of Doom.*** As regular readers will know, there is a bugged version of this game in circulation.

The method to use to get into the pyramid is get a key out of the pool and one from digging in the desert. Dig by the pyramid.

Use both keys to open the doors and enter the big door.

## BUG HUNTERS

W.E. Trevelyan has written in with more information about the bugs in ***Classic Adventure:***

- Saved data cannot be reloaded because the OSFILE calls are incorrectly coded.
- The program hangs when entering the vending-machine location. Note: you don't need to go here anyway.
- It also hangs at the dead-end near the volcano.
- The spices could not be collected.

I know of some of these bugs, having found them myself. I have managed to get the spices though, so there may be different bugged versions about.

Mr Trevilyan has contacted Melbourne House and they have sent him a working version of the game. I also have contacted them and they are sending me the same version, so I will report back about it.

If you have the bugged version, contact Melbourne House direct (the address is in the cassette insert).

## SOS

Harvey Reynolds wants to know what words to use and when to use them when trying to play the mirror in ***Ghost Town.***

He also wants to know whether you can bring the two telegraph keys together or not. Can anyone help?

S.D. Webb writes that he has ***Hareraiser*** and can't get started. I have never seen the game so can't help him, can anybody else?

Joshua Bridgens younger brother (yes, another one), wants to know if you can get on to the fourth level in ***Hell-Hole*** without going over the pit.

Unfortunately, I don't have room this month for the Hall of Fame and Feedback. These sections will be back next time with tips from Paul Southgate, Paul Edmans, Mike Herring, Jason Palmer and David Carlton. Why haven't I got *your* tips yet?

Watch out for the stone falling on you.

If this doesn't work you have the bugged version.

Does anyone know yet whether this is a genuine bug or is caused by the Plus 1?

What do you want to move

the altar for, Harvey? Search the fireplace and then clean what you find to reveal the ruby.

You can't get the acid. The bones and chopping block are red herrings and the rats are an obstacle. There is another route you should take. Use a dropped skull on the metal rod. Shoot the nomad.

Julie Atwill says that she has used diaxos to open the safe in ***Sphinx Adventure*** but can't get into it. Go up.

Paul Dougherty, Scott Clark and Darren Clifton all want to know where the laser is and how to use it in ***Stranded.***

Climb one of the trees in the forest. Use what you find at the cliff overlooking the spaceship near the start location. Get the laser and use the parachute again.

***Wheel of Fortune*** is causing trouble, too. Jonathan Stewart can't extend the ladder to get across the pit. You must be doing something wrong. How did you extend it to get the bucket?

David Ashbury wants to know how to stop the beggar from pushing the ladder away and how to befriend him. Doing the second will stop the first, so think what you usually give to beggars.

S.D. Webb needs help to get into the machinery housing door and past the troll. Use the hairpin to keep picking the lock. What do a basket, a charming Indian and a flute have in common? Use the answer to get past the troll.

This month I have had my first question about Adventure International's superb new game ***Robin Hood.*** To get out of the dungeon stand on someone's shoulders and grab the guard's ankle when he walks past.

Search him to get his sword, force the lock on the grating and undo the bolt.

Andrew Foxall and John Tipper have written in for help with ***The Count.***

Forget the vents and the daises. From the ledge just GO WINDOW. You can't get into the oven.

If you find you suffocate in the coffin it is because you haven't used a sharp object to break the bolt. Try GO TOILET for a laugh, but that's all it is. Only the torch can be found in the dungeon.

A puzzled Nick Southgate needs some answers to his problems in ***Eye of Zoltan.*** Where are the gloves? Inside the wardrobe in the wizard's bedroom.

Where is the money for the old man? In the woodcutter's hut. Where is the small key for the wardrobe (and the chest)? E-S-E of the crossroads.

Nick also wants to know what he needs to dock the rocket in ***Super Agent Flint.*** You must insert the correct disc into the rocket's disc drive and be wearing the helmet and suit.

For all those of you who haven't managed to map the witch maze in ***Twin Kingdom Valley,*** and especially for Shaun Haughton, here are the various routes.

Passage (with rod) -S-N-E-W-Witch-E-E-S-N-Passage; Bone room -S-W-S-E-Witch-W-W-W-S-Bone room.

Staying with TKV, David Ashbury wants to know what the secret of hidden doors is and Neil Johnston wants to know how to get to the armoury through the small crack and why he sometimes meets the giant and sometimes the princess when he goes into the dungeons.

Some doors are invisible until you swim in Watersmeet. Don't try and get through the crack – a silver door will give you egress.

There are two dungeons and two bronze doors – you are mixing them up.

Richard Jay can't get past the tiger in ***Stolen Lamp.*** This is one occasion when you do need a red herring.

It seems as though everyone has questions to ask about ***Spiderman*** this month. Hydroman is averse to temperatures below 32 degrees.

If you haven't found out how to get the bio gem, try using your web from outside.

Ice block? I don't remember there being one. Can anyone help?

Use your web on the fan. Mysterio's cloud is a bit of a poser. Try JUMP and UP. Electro won't be a problem if you are holding Dr Ock.

David Ashbury wants to know how to get past the rock without it falling on his head in ***Castle Frankenstein.*** I presume you mean the rocks that Igor throws at you when you are in the steep slope at the side of the castle. If so, wear something to protect your head.

Mike Herring would like some help with ***Pettigrew's Diary.*** The code for the fun house is 58. Barry's room number is 40. The old man in Hyde Park? Shout KULFATYN.

John Tipper is stuck in an adventure that I haven't seen in ages and no longer have a copy of, ***Wizard of Akyrz.*** He wants to know how to get out of the palace and what to use the spectacles for.

As I remember, you examine a chest in one of the corridors – this has a secret panel – and exit from the palace. You'll need the glasses underground.

John is also stuck in ***Adventureland.*** You'll need the firebrick to deal with the lava. The bear is a rather timid creature and prone to sudden jumps at loud, vocal noises.

You can get in and out of the bee's lair if you take a mud-bath first.

What do you want to get gas for the torch for? Use the matches. The gas can be got in an empty wine bladder though.

To get the golden fish you must use the bottle but have the golden net with you.

Finally, John also needs help with ***Pirate Adventure.*** Yes, it is OK to give rum to the pirate, and you need a fish to get past the crocodiles.

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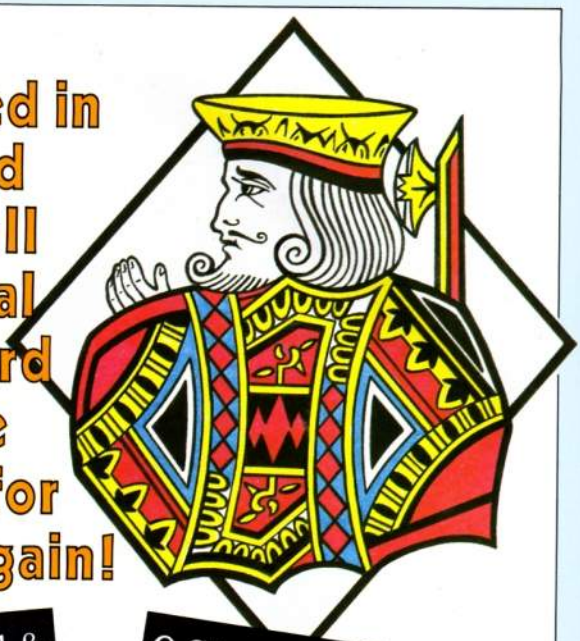

*Electron cassette can also be used on the BBC Micro*

***Electron cassette £5.95 each***

***3½" disc £7.95 each***

**TO ORDER, PLEASE USE THE FORM ON PAGE 61**

# The Easter Egg Hunt

**PETER Rabbit is a greedy guts! He's no longer content with going into gardens to steal lettuce. Now he's trying to find a hidden Easter Egg.**

He plans to find the egg and take it to his house – but he has an awkward little problem.

A group of invisible elves keep stealing and hiding the egg whenever Peter finds it. If only he could remember where the elves were standing, he could find a way to avoid them.

The elves are not all bad though. When Peter sets off to find the egg they tell him whether to travel north, east, south or west to find it.

Your job is to guide Peter to the egg and then to the house at the top of the screen.

It requires some luck, but strategy and memory, as well as an understanding of compass bearings, are also needed.

In fact the game, apart from being fun, is a good way of learning the four points of the compass and the use of coordinates.

To enable a three colour Peter to be drawn, he is poked directly on to the screen.

If you've followed the series on machine code graphics in *Electron User* you'll understand how such characters can be created, but you may be surprised to hear that it can be done within a Basic program.

The data for Peter is read from line 440 and the character is printed at line 370. Despite the fact that all the instructions are in Basic, the character moves fairly smoothly from one location to the next.

The program itself is straightforward. Procedures have been given names which tell their purpose, with the main program occupying lines 40 to 220 and the procedures being defined after that.

**Rog Frost**

**MAIN VARIABLES**

| | |
|---|---|
| **X%** | Peter's address. |
| **oldx%** | Peter's old address. |
| **pos%** | Square that Peter occupies. |
| **help%( )** | The elves' squares. |
| **loc%( )** | Addresses for Peter relative to X%. |
| **char%( )** | Data for Peter. |
| **what%** | Data for Egg. |
| **egg%** | Location of the egg. |

**Full listing starts on Page 34**

```
  10 REM Easter Egg Chase
  20 REM By Roger Frost
  30 REM (C) Electron User
  40 *FX202,32
  50 MODE6:VDU23;8202;0;0;
0;
  60 PROCinstruct
  70 PROCdefchar
  80 REPEAT
  90 MODE5
 100 VDU23;8202;0;0;0;
 110 ON ERROR GOTO1300
 120 PROCinit
 130 PROCgrid
 140 REPEAT
 150 PROCmovechar
 160 PROCcheck
 170 UNTILposX=79AND eggX=
100
 180 MODE6:VDU23;8202;0;0;
0;19,0,4;0;
 190 PROCend
 200 PRINTTAB(5,22)"Press
Space bar for next game.":R
EPEATUNTILGET=32
 210 UNTIL0
 220 END
 230 DEFPROCmovechar
 240 moveX=moveX+1
 250 oldX=XX:flagX=0:oldf
X=FX
 260 REPEAT
 270 *FX15,1
 280 get$=GET$
 290 IF posX=78 AND eggX<>
100 AND get$="." PRINTTAB(0
,29)"NO EGG!  NO ENTRY!":GO
TO350
 300 IF posX=69 AND eggX<>
100 AND get$="A" PRINTTAB(0
,29)"NO EGG!  NO ENTRY!":GO
TO350
 310 IF get$="." AND posX
MOD 10<>9 XX=XX+24:posX=pos
X+1:flagX=1:FX=0
 320 IF get$="," AND posX
MOD 10<>0 XX=XX-24:posX=pos
X-1:flagX=1:FX=16
 330 IF get$="A" AND posX<
70 XX=XX-960:posX=posX+10:f
lagX=1
 340 IF get$="Z" AND posX>
9 XX=XX+960:posX=posX-10:fl
agX=1
 350 UNTILflagX=1
 360 PRINTTAB(0,29);SPC(39
)
 370 FORN%=1TO16:?(XX+locX
(N%+FX))=charX(N%+FX):?(old
xX+locX(N%+oldFX))=0:NEXT
 380 IF eggX=100 PROCundra
wegg:PROCdrawegg
 390 ENDPROC
 400 DEFPROCdefchar
 410 DIMlocX(32),charX(32)
,helpX(8)
 420 loscore%=50:name$="Th
e Mad March Hare"
 430 help$="An elf says "
 440 FORN%=1TO32:READlocX(
N%),charX(N%):NEXT
 450 DATA0,7,1,4,2,4,3,4,4
,14,5,105,6,105,7,7,320,74,
321,120,322,15,323,15,324,1
5,325,142,326,140,327,207,0
,14,9,2,10,2,11,2,12,7,13,1
05,14,105,15,14,328,37,329,
225,330,15,331,15,332,15,33
3,23,334,19,335,63
 460 DATA8,14,9,2,10,2,11,
2,12,7,13,105,14,105,15,14,
328,37,329,225,330,15,331,1
5,332,15,333,23,334,19,335,
63
 470 ENDPROC
 480 DEFPROCdrawegg
 490 RESTORE520
 500 FORN%=1TO5:READwhereX
,whatX:?(XX+whereX-FXDIV2)=
whatX:NEXT
 510 ENDPROC
 520 DATA14,96,15,105,328,
15,329,105,330,96
 530 DEFPROCundrawegg
 540 RESTORE520
 550 FORN%=1TO5:READwhereX
,whatX
 560 IF eggX=100 ?(oldX+w
hereX-oldFXDIV2)=0 ELSE ?(X
X+whereX-FXDIV2)=0
 570 NEXT
 580 ENDPROC
 590 DEFPROCcheck
 600 IF posX=eggX PRINTTAB
(0,29)"EGG FOUND":eggX=100:
PROCdrawegg:SOUND&11,2,100,
50
 610 FOR checkX=1TO8:PROCh
elpcheck:NEXT
 620 ENDPROC
 630 DEFPROChelpcheck
 640 IF posX(>helpX(checkX
) ENDPROC
 650 IF eggX=100 PRINTTAB(
0,29)"YOU'VE BEEN ROBBED":S
OUND&11,3,100,50:PROCegg:PR
OCundrawegg:ENDPROC
 660 SOUND&11,1,100,10
 670 IF posX MOD2=1 AND eg
gX MOD 10>posX MOD 10 PRINT
TAB(0,29);help$;"go East"
 680 IF posX MOD2=1 AND eg
gX MOD 10<posX MOD 10 PRINT
TAB(0,29);help$;"go West"
 690 IF posX MOD2=1 AND eg
gX MOD 10=posX MOD 10 PRINT
TAB(0,29);help$;"go"'"due N
orth or South"
 700 IF posX MOD2=0 AND eg
gX DIV 10=posX DIV 10 PRINT
TAB(0,29);help$;"go"'"due E
ast or West"
 710 IF posX MOD2=0 AND eg
gX DIV 10>posX DIV 10 PRINT
TAB(0,29);help$;"go North"
 720 IF posX MOD2=0 AND eg
gX DIV 10<posX DIV 10 PRINT
TAB(0,29);help$;"go South"
 730 ENDPROC
 740 DEFPROCgrid
 750 VDU5
 760 FORrankX=140TO1100STE
P96
 770 IF rankX<1050 MOVE ra
nkX+24,200:PRINT;CHR$(rankX
/96+64)
 780 MOVErankX,232:DRAWran
kX,1000:NEXT
 790 FORfileX=232TO1024STE
P96
 800 IF fileX<950 MOVE65,f
ileX+40:PRINT;CHR$(fileX/96
+95)
 810 MOVE140,fileX:DRAW110
0,fileX:NEXT
 820 PROChouse
 830 VDU4
 840 XX=24064:posX=69
 850 FORN%=1TO16:?(XX+locX
(N%))=charX(N%):NEXT
 860 ENDPROC
 870 DEFPROChouse
 880 GCOL0,1
 890 MOVE1010,910:MOVE1090
,910:PLOT85,1010,950:PLOT85
,1090,950:PLOT85,1040,990:P
LOT85,1060,990
 900 GCOL0,2:MOVE1040,910:
MOVE1040,950:PLOT85,1060,91
0:PLOT85,1060,950
 910 ENDPROC
 920 DEFPROCinit
 930 moveX=0:FX=0
 940 FORnoX=1TO7:help$(noX
)=RND(18)-1+(noX-1)*18:NEXT
 950 help$(8)=78+RND(7)
 960 *FX11,0
 970 ENVELOPE1,2,5,-3,2,5,
5,5,126,0,0,-126,126,126
 980 ENVELOPE2,3,1,2,3,5,1
0,20,126,0,0,-126,126,126
 990 ENVELOPE3,3,-1,-2,-3,
20,10,5,126,0,0,-126,126,12
6
1000 ENVELOPE4,1,1,-1,1,3,
3,3,126,0,0,-126,126,126
1010 PROCegg
1020 ENDPROC
1030 DEFPROCegg
1040 REPEAT:giftX=TRUE:egg
X=RND(78):FOR noX=1TO8
1050 IF eggX=helpX(noX) gi
ftX=FALSE
1060 NEXT
1070 UNTILgiftX=TRUE
1080 ENDPROC
1090 DEFPROCend
1100 PRINTTAB(12,2)"CONGRA
```

```
TULATIONS"TAB(12,3)"********
**********
 1110 PRINTTAB(11,5)"YOU TO
OK "¦moveX¦" MOVES"
 1120 PROCtune
 1130 IF moveX<loscoreX PRI
NTTAB(8,9)"Your score is th
e best.":INPUTTAB(3,11)"Ple
ase enter your name "¦name$
:loscoreX=moveX:ENDPROC
 1140 lenX=LEN(name$)
 1150 PRINTTAB(8,10)"The lo
west score is "¦loscoreX;TA
B((40-10-lenX)/2,12)"scored
 by "¦name$
 1160 ENDPROC
 1170 DEFPROCinstruct
 1180 VDU19,0,4;0;
 1190 PRINTTAB(10,2)"The Ea
ster Egg Chase"TAB(10,3)"**
**********
 1200 VDU28,1,24,38,5
 1210 PRINT"As Peter, the E
aster Rabbit, stands onhis
 doorstep he knows that some
 where"'"out in the garden a
 n Easter Egg lies"'"hidden.
  He sets out on a journey t
 o"'"find it."
 1220 PRINT'"Peter is not r
 eally helped by a band"'"of
  rather mischievous elves.
 These"'"merry little souls
 will help Peter"'"if he's n
 ot got the egg by"'"telling
  him which way to go."
 1230 PRINT"If Peter meets
 an elf when he has"'"found
 the egg, the elf will"'"ste
 al it and hide it again."
 1240 PRINTTAB(5,17)"Press
 Space to continue":REPEATUN
 TILGET=32:CLS
 1250 PRINT"If an elf says
 'Go East', it does not"'"ne
 cessarily mean due East. It
  just"'"means somewhere Eas
 t of the column"'"Peter is
 in. The same applies to Wes
 t,North and South."
 1260 PRINT"The elves do no
 t move during a game"'"but
 they will be in different p
 laces"'"in the next game."
 1270 PRINT'"Can you guide
 Peter to the egg"'"and then
  safely back in to his home
 ?"
 1280 PRINTTAB(5,17)"Press
 Space to continue":REPEATUN
 TILGET=32:CLS
 1290 PRINT''"The controls
 for this game are:-"''"   A
 .....North"'"   Z.....South
 "'"   <.....West"'"   >....
 .East"
 1300 PRINTTAB(5,17)"Press
 Space to continue":REPEATUN
 TILGET=32
 1310 ENDPROC
 1320 DEFPROCtune
 1330 RESTORE1350
 1340 FORNX=1TO39:READpitch
 X,durX:SOUND1,4,pitchX,durX
 :SOUND1,0,0,1:NEXT
 1350 DATA128,7,80,7,100,14
 ,128,7,80,7,100,14,128,3,12
 0,3,116,3,100,3,100,3,100,3
 ,116,3,120,3,128,7,80,7,100
 ,14
 1360 DATA116,3,116,3,116,5
 ,116,2,116,7,100,7,100,3,10
 0,3,116,3,120,3,100,14,128,
 3,120,3,116,3,100,3,100,3,1
 00,3,116,3,120,3,128,7,80,7
 ,100,14
 1370 ENDPROC
 1380 MODE6:PRINT:REPORT:PR
 INT" at line ";ERL
 1390 *FX12,0
 1400 END
```

*This listing is included in this month's cassette tape offer. See order form on Page 61.*


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**BACH to Basics is a simple tonic sol fah tutor in which the computer plays a tune and the pupil plays it back, aided by a graph of notes.**

**Tunes are entered by pressing the number keys 1 to 8 – 1 for doh, 2 for ray and so on.**

**The program is designed so that a pupil can start off at a very simple level and subsequently move up through intermediate to advanced levels.**

**A running score is kept to give the pupil an idea of how well he or she is doing.**

**Several options are available including four levels of difficulty, three different speeds and an option to turn screen output off – to make the pupil work by ear.**

**If you wish to add to the music data place the new data from line 1150 onwards, using 1 for doh, 2 for ray and so on.**

**Having done that you re-dimension *A%(40,8)* in line 270 so that the 40 is replaced by the total number of music data lines. Then replace the 40 in *m%=RN(40)* in line 560 with the total number of tunes in your new version.**

### MAJOR VARIABLES

| | |
|---|---|
| LD% | Level of difficulty. |
| SP% | Speed or tempo of music. |
| GB% | Set to 2 if the display is disabled. |
| T% | The pupil's input or note to be played. |
| NC% | Score. |
| L% | Temporary score. |
| A%(40,8) | Data for 40 tunes. |
| B%(8) | Pitch of each of the eight notes. |

### PROGRAM STRUCTURE

| | |
|---|---|
| 210-240 | Downloader. |
| 270-280 | Initialise. |
| 290-340 | Main play loop. |
| 750-1140 | Data for 40 tunes. |

### PROCEDURES

| | |
|---|---|
| instructions | Displays the instructions. |
| select | Selects the various options. |
| question | Plays a random tune. |
| bar | Draws a bar of the graph. |
| sound | Plays a note from a tune. |
| double, double1 | Display double height text. |

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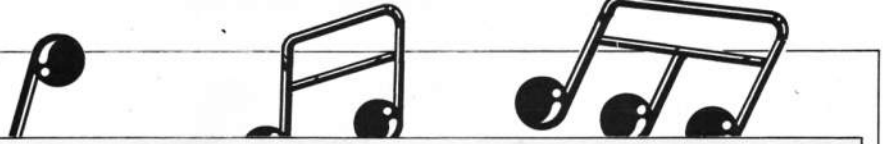

```
  100 REM ******************
  110 REM *                *
  120 REM * Bach to Basic *
  130 REM *                *
  140 REM *  Robin Nixon   *
  150 REM *                *
  160 REM * (c)  Electron *
  170 REM *       User     *
  180 REM *                *
  190 REM ******************
  200 REM
  210 IF PAGE=&E00 THEN GOT
O 250
  220 *K.0 "CLS:*FX3,2!M=T.
!MFORIX=PAGE TO TOP STEP4:!
(&E00+IX-PAGE)=!IX:NEXT:PA.
=&E00!MOLD!MRUN!M"
  230 *FX138,0,128
  240 END
  250 *FX3,0
  260 *FX16
  270 MODE1:VDU23;8202;0;0;
0;:DIM CHX 8,AX(40,8),BX(8)
:RESTORE 740:FOR JX=1 TO 8:
READ BX(JX):NEXT:RESTORE 75
0:FOR JX=1 TO 40:FOR KX=1 T
O 8:READ AX(JX,KX):NEXT KX,
JX:PROCinstructions
  280 LDX=1:SPX=1:GBX=1:NQX
=0:NCX=0
  290 MODE1:VDU23;8202;0;0;
0;:PROCselect
  300 MODE 2:VDU23;8202;0;0
;0;:PROCquestion
  310 VDU 28,4,31,19,8,12,2
6:COLOUR 7:PRINTSPC3;"Enter
 the tune";:LX=0:FOR JX=1 T
O LDX*2:REPEAT:TX=GET-48:UN
TILTX)9 AND TX(9:PROCsound:
PROCbar:IF TX=AX(MX,JX) LX=
LX+1
  320 NEXT:NQX=NQX+LDX*2:NC
X=NCX+LX:VDU 31,0,0:PRINTSP
C20;
  330 COLOUR 2:VDU31,0,0:PR
INT"RIGHT ";NCX;:VDU 31,11,
0:COLOUR 1:PRINT"WRONG ";NQ
X-NCX;:VDU 31,5,2:COLOUR 4:
PRINT"SCORE ";INT((NCX+1)/(
NQX+1)*100);"%";
  340 VDU 31,3,5:COLOUR 6:P
RINT"Space to play";:VDU 31
,4,7:COLOUR 5:PRINT"M  for
menu";:REPEATUNTILINKEY$(0)
="":REPEAT:G$=GET$:UNTILG$=
" " OR G$="M":IF G$=" " GOT
O300 ELSE GOTO 290
  350 END
  360 DEFPROCinstructions
  370 COLOUR 2:COLOUR 129:V
DU 31,11,1:PROCdouble(" Bac
h to basics "):COLOUR 3:COL
OUR 128:PRINT''
  380 PRINT"Bach to basics
(excuse the pun!) is a"''"si
mple music tutur in which t
he"''"computer plays a tune
and the pupil"''"plays it ba
ck."''
  390 PRINT"Several options
 are available to the"''"pup
il including 4 levels of di
fficulty,"''"3 different spe
eds and an option to"''"turn
 screen output off."''
  400 PRINT"The program is
designed such that a"''"pupi
l can start off at a very s
imple"''level and, as he or
 she learns more,"''"move up
 through intermediate to"''"
advanced levels."''
  410 PRINT"A running score
 is kept to give the"''"pupi
l an idea of how well he or
 she"''is doing. Tunes are
entered by pressing"''"the n
umbers 1 - 8."
  420 COLOUR 3:COLOUR 129:V
DU 31,12,30:PROCdouble(" Pr
ess  Space ");REPEATUNTILIN
KEY(-99)=0:REPEATUNTILINKEY
(-99):ENDPROC
  430 DEFPROCselect:COLOUR
2:COLOUR 129:VDU 31,11,1:PR
OCdouble(" Bach to basics "
):COLOUR 3:COLOUR 128:VDU 3
1,1,21:PRINT"Enter selectio
n or press Space to play"
  440 RESTORE 640:FORJX=1 T
O 4:READ A$:IF LDX=JX COLOU
R 1:COLOUR 131 ELSE COLOUR
2:COLOUR 128
  450 VDU 31,(40-LENA$)/2-1
,5+JX:PRINTA$;:NEXT
  460 RESTORE 680:FORJX=1 T
O 3:READ A$:IF SPX=JX COLOU
R 1:COLOUR 131 ELSE COLOUR
2:COLOUR 128
  470 VDU 31,(40-LENA$)/2-1
,10+JX:PRINTA$;:NEXT
  480 RESTORE 710:FORJX=1 T
O 2:READ A$:IF GBX=JX COLOU
R 1:COLOUR 131 ELSE COLOUR
2:COLOUR 128
  490 VDU 31,(40-LENA$)/2-1
,14+JX:PRINTA$;:NEXT
  500 REPEATUNTILINKEY(-99)
=0
  510 *FX15
  520 REPEAT:G$=GET$:IX=INS
TR("EAHVSMFGB",G$):UNTIL IX
 OR G$=" ":IF G$=" " ENDPRO
C
  530 IF IX(5 LDX=IX:GOTO44
0 ELSE IF IX)4 AND IX(8 SPX
=IX-4:GOTO460 ELSE GBX=IX-7
:GOTO480
  540 DEFPROCquestion:IF GB
X=2 GOTO 560
  550 RESTORE 730:COLOUR 7:
FOR JX=30 TO 9 STEP -3:READ
 A$:VDU 31,8,JX:PRINTA$;:NE
XT
  560 MX=RND(40):FOR JX=1 T
O LDX*2:TX=AX(MX,JX):PROCba
r:PROCsound
  570 NEXT:ENDPROC
  580 DEFPROCbar:IF GBX=2 E
NDPROC ELSE GCOL 0,((JX-1)
MOD 7)+1:MOVE JX*128+128,0:
MOVE JX*128+248,0:PLOT 85,J
X*128+128,TX*96-4:PLOT 85,J
X*128+248,TX*96-4:GCOL 0,0
  590 FOR KX=1 TO TX-1:MOVE
 JX*128+128,KX*96:DRAW JX*1
28+248,KX*96:MOVE JX*128+12
8,KX*96+4:DRAW JX*128+248,K
X*96+4:NEXT:ENDPROC
  600 DEFPROCsound:SOUND 1,
-2,BX(TX),28:TIME=0:REPEAT
UNTILTIME=(3-SPX)*35+10:*FX
21,5
  610 ENDPROC
  620 DEFPROCdouble(SC$):FO
RJJX=1TOLENSC$:PROCdouble1(
ASC(MID$(SC$,JJX,1))):NEXT:
ENDPROC
  630 DEFPROCdouble1(PC%):I
%=CHX AND 255:TX=CHX/256:AX
=10:?CHX=PC%:CALL&FFF1:VDU2
3,244,CHX?1,CHX?1,CHX?2,CHX
?2,CHX?3,CHX?3,CHX?4,CHX?4,
23,245,CHX?5,CHX?5,CHX?6,CH
X?6,CHX?7,CHX?7,CHX?8,CHX?8
,11,244,10,8,245:ENDPROC
  640 DATA "E Easy      2
notes"
  650 DATA "A Average   4
notes"
  660 DATA "H Hard      6
notes"
  670 DATA "V Very hard  8
notes"
  680 DATA "S Slow   speed"
  690 DATA "M Medium speed"
  700 DATA "F Fast   speed"
  710 DATA "G  Graph"
  720 DATA "B  Blind"
  730 DATA doh,ray,me,fah,s
oh,lah,te,doh
  740 DATA 181,189,117,121,
129,137,145,149
  750 DATA 1,2,3,4,5,6,7,8
  760 DATA 8,7,6,5,4,3,2,1
  770 DATA 1,3,5,8,8,5,3,1
  780 DATA 8,5,3,1,1,3,5,8
  790 DATA 2,5,3,6,4,7,5,8
  800 DATA 8,5,7,4,6,3,5,2
  810 DATA 1,3,5,3,1,5,3,1
  820 DATA 8,7,8,6,7,6,7,5
  830 DATA 1,2,1,2,3,3,3,1
  840 DATA 1,2,3,4,5,4,3,2
  850 DATA 1,1,3,3,2,2,5,5
  860 DATA 1,2,3,2,3,4,3,5
  870 DATA 8,7,6,5,8,7,6,5
  880 DATA 1,2,3,4,1,2,3,4
  890 DATA 1,3,5,8,1,3,5,8
  900 DATA 8,5,3,1,8,5,3,1
  910 DATA 1,5,3,8,3,5,8,1
  920 DATA 5,5,4,4,3,5,2,5
  930 DATA 1,1,5,5,6,6,5,5
  940 DATA 4,4,3,3,2,2,1,1
  950 DATA 1,3,5,8,8,7,6,5
  960 DATA 8,5,3,1,1,2,3,4
  970 DATA 7,6,5,7,5,4,3,1
  980 DATA 2,3,1,3,4,5,3,5
  990 DATA 4,6,5,4,3,1,3,2
 1000 DATA 8,7,6,4,3,4,5,3
 1010 DATA 1,2,3,4,5,6,3,2
 1020 DATA 8,1,8,1,5,3,5,1
 1030 DATA 8,1,7,2,6,3,5,4
 1040 DATA 4,5,3,6,2,7,1,8
 1050 DATA 8,7,4,5,3,2,5,1
 1060 DATA 3,6,4,5,8,7,2,3
 1070 DATA 5,5,7,6,4,4,3,8
 1080 DATA 2,2,3,4,5,5,7,8
 1090 DATA 6,6,7,7,1,3,8,2
 1100 DATA 4,4,5,3,4,5,6,6
 1110 DATA 8,8,2,2,7,3,5,1
 1120 DATA 1,1,3,3,3,5,5,8
 1130 DATA 8,6,4,2,1,3,5,7
 1140 DATA 7,1,5,3,8,4,2,6
 1150 REM
 1160 REM * Any further
 1170 REM * tunes go here
```

*This listing is included in this month's cassette tape offer. See order form on Page 61.*

MicroLink
in association with
TELECOM GOLD

No. 8 April 1986

# NEWSLETTER

## Hot line for fishermen

ICELANDIC subscriber Ingiber Oskarsson is casting his net wide, hoping to catch MicroLink members and their friends who are involved in fishy business.

Ingiber works in the fish processing industry, based in Keflavik, and wants to contact other system users with connections in the trade.

His company supplies salted fish to customers in Spain, Portugal and Italy.

This takes care of all the cod that's brought ashore, but it leaves him with plenty of other species on the slab – and he'd like to find markets for them.

Haddock, catfish, halibut – and the exotically-named tusk and redfish – are available, fresh and unsalted, and Ingiber can be contacted on MAG20213.

## LINK WITH THE ERA OF STEAM

THE British Rail booking service on MicroLink isn't all about high speed Inter City travel. It also caters for those who like to hark back to a more leisurely and stylish era.

Subscribers can turn back the clock by taking their reserved seats on one of a series of steam-hauled excursions running between Marylebone Station and Stratford-upon-Avon on Sundays during the spring and summer months.

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MicroLink plans to add more special train excursions to its British Rail booking service in the near future.

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**Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.**

## Satellite covers weather scene

A DRAMATIC breakthrough on the computer front now allows MicroLink subscribers to discover what the weather holds in store.

Whether they live in Turkey or Torquay, they can tap into the same information from outer space that enables the men from the Met Office to predict sunshine or showers.

The reason for this is WeatherLink, an exclusive new service on MicroLink.

Using an aerial based in Kent, signals from the NOAA9 weather satellite are intercepted and converted into electronic data.

The receiver works on circular polarisation to follow NOAA9 every time it appears on the horizon, faithfully monitoring it until it disappears from view some 15 minutes later.

And the same sequence is followed on average four times a day.

Live pictures produced by the satellite hovering 450 miles overhead – it takes two at a time, one in visible light, the other infra red – clearly show the part of the world from North Africa, through Europe and Great Britain up to Iceland.

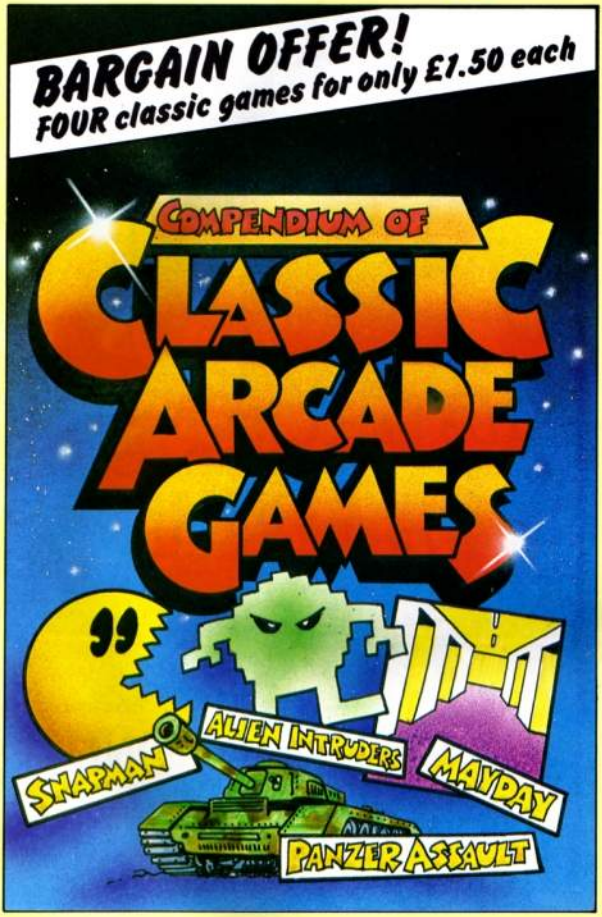
All these are recorded on a micro linked to the receiving aerial. The next stage involves a converter which takes the image and readies it for transmission over standard telephone lines to the main MicroLink computer.

Once a MicroLink subscriber logs on, all he needs to do is pull down the information file in its expanded format, compress it using specially written software which is also on the MicroLink menu, and then display it.

Launched on February 12, WeatherLink generated such excitement that a team from Thames Television was on hand to cover the event.

At exactly 3.05pm, subscriber John Wallbridge achieved a world first by displaying the first weather satellite picture on his micro in his London home.

# Here's something SPECIAL from

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Part 1

# OSWORD

**JOHN WOOLLARD begins his series by looking at what these machine code calls can do for you**

**OVER the next few months I'll be investigating those special calls named Osword that are available to Electron users. I'll present a short program or procedure to go with each.**

But before we start finger tapping, we'll take a general look at what they can do.

Some of you will have read up on FX calls in past issues of *Electron User*. Their other name is Osbyte – they are the operating system calls which enable us to affect the way our Electrons behave.

An example of an Osbyte call is *FX137,1,0 which is used to turn on the cassette player relay.

Osbyte calls use only three parameters. In this case A=137, X=1 and Y=0.

Instead of the *FX command we could assign the three values to *A%*, *X%* and *Y%* respectively and then call &FFF4.

Osbytes are limited because only three parameters can be passed to them. Suppose we want to pass more data with our calls. That's where Oswords come into play!

Oswords are operating system calls that can deal with many bytes of data, in some cases up to 15 bytes or units of information.

Let's see what Oswords can do. Table I lists the 14 calls available to you and each will be dealt with in this series of articles.

I've indicated if there's an equivalent instruction in Basic, and for reference I've stated the number of bytes that have to be given to the call for it to operate, and the number of bytes the call returns.

You might ask: "If there's a Basic instruction that will do the same as an Osword call then why worry about Osword?" The main reason is that these calls are very easy to use in machine code programs.

Some Basic instructions, like POINT and INPUT, are not available directly in assembly language, but the equivalent Osword calls are simple to apply.

Some of the program examples I'll use will be pure machine code work. So I'll endeavour to make them straightforward.

If you've not tried machine code programming before I'm sure you'll find them helpful.

The calls that haven't an equivalent Basic command will be called from a Basic program.

As I mentioned earlier, Osword calls are very similar to the Osbyte (FX) calls that are available to Basic programmers.

The name suggests that Oswords can send, or read, more data than Osbyte calls. That's the reason they're more difficult to master.

With an FX call only the values passed in A, X and Y are used to determine the action of the routine invoked.

With Oswords the values in X and Y point to a location in the memory which contains the values to be used.

X holds the low and Y the high byte of the address. That location, which is called a parameter block, may contain 1 or up to 14 bytes of data, according to the number of the call being made.

One difficulty lies in how to make sure that the correct data is placed in the correct location.

When the call is made the location specified by X and Y is also used to store any information returned by the routine. A further process must be undertaken to retrieve the data from that location.

Making the Osword call is similar to making an Osbyte call. The necessary values are placed in *A%*, *X%* and *Y%*, then CALL &FFF1 is used.

There isn't the equivalent of Osbyte's *FX command. It's not usually necessary to determine the values of *A%*, *X%* *Y%* and the register after the call has been made, therefore USR(&FFF1) is not used.

A typical call from Basic could look like this:

```
A%=1:X%=&00:Y%=&09:CALL
&FFF1
```

That particular line would generate Osword call 1, which reads the internal time-elapsed clock. The parameter block would be placed at

| Call | Bytes sent | Bytes back | Basic | Action |
|---|---|---|---|---|
| A=0 | 5 | 0 | INPUT | Reads a line of data from keyboard. |
| A=1 | 0 | 6 | TIME | Reads system elapsed-time clock. |
| A=2 | 6 | 0 | TIME | Writes system elapsed-time clock. |
| A=3 | 0 | 6 | | Reads interval timer. |
| A=4 | 6 | 0 | | Writes interval timer. |
| A=5 | 4 | 1 | | Reads a byte from I/O processor memory. |
| A=6 | 5 | 0 | | Writes a byte to I/O processor memory. |
| A=7 | 8 | 0 | SOUND | Performs a sound command. |
| A=8 | 14 | 0 | ENVELOPE | Defines an envelope for use with a sound command. |
| A=9 | 4 | 1 | POINT | Reads a pixel value and returns the logical colour number at a particular screen position. |
| A=&A | 1 | 8 | | Reads the dot pattern of a specified displayable character. |
| A=&B | 1 | 2 | | Reads the palette for a given logical colour. |
| A=&C | 5 | 0 | VDU19 | Writes the palette value for a given logical colour. |
| A=&D | 0 | 8 | | Reads the current and previous graphics cursor position. |

*Table I: Summary of the Osword calls.*

START OF A NEW SERIES!

location &900 onward (that's where the YX points to).

Enough of the theory, let's get going with Program I. This makes a single Osword call with the accumulator equal to 10, that's the call which reads character definitions.

Line 20 sets the value of the variable *osword%* to &FFF1, the location to which an Osword call is made.

Line 30 sets the variable *block%* to be &900, the location of the start of the parameter block.

The X and Y registers are set to point to this. *X%* takes the least significant byte, using the MOD operator, and *Y%* to the most significant value using the DIV operator.

In this particular case *X%* will equal zero and *Y%* will equal 9. Line 40 places 65, the Ascii value of the character A, at the start of the block.

Looking at Table I you will see that this particular call requires one byte of data but will return eight bytes. Lines 90 onwards print out the values placed in the parameter block after the call has been made.

Figure I shows how those numbers are interpreted as the dot matrix of the letter A.

In Program I I've used the location &900 to store information. If you don't want to use that particular location you may choose others.

One alternative is to dimension an array, say *block%*, using:

```
DIM block% &F
```

on a line near the start of your program. This instruction reserves a 16 byte area of memory, *(block%+0, block%+1, . . . block%+15)*.

When the Osword call is made, X and Y must point to the start of that allocated space. However *block%* is determined, it is usual to use the instructions:

```
X%=block%MOD256
Y%=block%DIV256
```

```
 10 REM PROGRAM I
 20 oswordX=&FFF1
 30 block%=&900
 40 ?block%=ASC("A")
 50 A%=10
 60 X%=block% MOD 256
 70 Y%=block% DIV 256
 80 CALL osword%
 90 FOR k%=&900 TO &908
100 PRINT ?k%
110 NEXT
120 END
```

*Program I*

| Ascii value = 65 | Character = A | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ?&900 = 65 | A%=10 X%=0 Y%=9 | | | | | | | |
| | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| ?&901 = 60 | | | ■ | ■ | ■ | ■ | | |
| ?&902 = 102 | | ■ | | | | | ■ | |
| ?&903 = 102 | | ■ | | | | | ■ | |
| ?&904 = 126 | | ■ | ■ | ■ | ■ | ■ | ■ | |
| ?&905 = 102 | | ■ | | | | | ■ | |
| ?&906 = 102 | | ■ | | | | | ■ | |
| ?&907 = 102 | | ■ | | | | | ■ | |
| ?&908 = 0 | | | | | | | | |

*Figure I: How character A is built up*

Before calling Osword with CALL &FFF1.

Now let's move on to some practical applications. This month all the demonstrations use Osword 10, the call that reads the character definition bytes.

Page 93 of the User Guide gives an explanation of how the character definition is made up of eight bytes of data.

Program II enables double height characters to be written in all the graphics modes.

The procedure first reads the character definition, and enlarges and prints the top half of the character. It then enlarges the lower half and prints it on the line below. An explanation of its working is made in the July 1984 *Electron User*.

Program III creates extra large characters on the screen. The 8×8 dot matrix of the

```
 10 REM PROGRAM II
 20 MODE1
 30 PROCdblp(3,3,"Electro
n User")
 40 END
 50 DEFPROCdblp(htab%,vta
b%,str$)
 60 LOCAL pos%,vpos%,k%
 70 vpos%=VPOS : pos%=POS
 80 FOR k%=1 TO LEN(str$)
 90 ?&70=ASC(MID$(str$,k%
))
100 A%=10
110 X%=&70
120 Y%=0
130 CALL &FFF1
140 VDU 23,255,?&71,?&71,
?&72,?&72,?&73,?&73,?&74,?&
74
150 PRINT TAB(htab%+k%,vt
ab%);CHR$255
160 VDU 23,255,?&75,?&75,
?&76,?&76,?&77,?&77,?&78,?&
78
170 PRINT TAB(htab%+k%,vt
ab%+1);CHR$255
180 NEXT
190 PRINT TAB(pos%,vpos%)
;
200 ENDPROC
```

*Program II*

```
 10 REM PROGRAM III
 20 MODE 4
 30 REPEAT
 40 PROClgep(0,0,GET,1)
 50 UNTIL FALSE
 60 END
 70 DEFPROClgep(htab%,vta
b%,chr%,size%)
 80 LOCAL pos%,vpos%,acro
ss%,down%,mag1%,mag2%
 90 vpos%=VPOS : pos%=POS
100 VDU 23,255,255,255,25
5,255,255,255,255,255
110 ?&70=chr%
120 A%=10
130 X%=&70
140 Y%=0
150 CALL &FFF1
160 FOR down%=0 TO 7
170 FOR mag1%=1 TO size%
180 PRINT TAB(htab%,vtab%
+size%*down%+mag1%);
190 FOR across%=7 TO 0 ST
EP-1
200 FOR mag2%=1 TO size%
210 IF 2^across% AND ?(&7
1+down%) THEN VDU 255 ELSE
VDU 32
220 NEXT
230 NEXT
240 NEXT
250 NEXT
260 PRINT TAB(pos%,vpos%)
;
270 ENDPROC
```

*Program III*

# Osword

*From Page 45*

character is enlarged to the size of an 8×8 character block on the screen. The procedure can be used in all graphic modes.

Again, there's a detailed explanation in the August 1984 *Electron User*.

Program IV uses the same Osword call to create italic style script in any mode. The lower half of he 8×8 matrix is displaced to the left before the character is printed.

In these three programs the parameter block has been placed in location &70 onwards. This particular area of zero page memory is reserved for your programs.

In each case the call is made by placing the Ascii value of the character to be printed in location &70, setting *X*% and *Y*% up to point to &70, setting *A*% to 10 and making the call with CALL &FFF1.

```
  10 REM PROGRAM IV
  50 CLS
  60 PROCitalic(5,10,"Elec
tron User")
  70 PRINTTAB(5,11);"Elect
ron User"
  80 END
  90 DEFPROCitalic(htabX,v
tabX,str$)
 100 LOCAL posX,vposX,kX
 110 vposX=VPOS : posX=POS
 120 PRINT TAB(htabX,vtabX
);
 130 FOR kX=1 TO LEN(str$)
 140 ?&70=ASC(MID$(str$,kX
))
 150 AX=10
 160 XX=&70
 170 YX=0
 180 CALL &FFF1
 190 VDU 23,255,?&71,?&72,
?&73,?&74,?&75+2,?&76+2,?&7
7+2,?&78+2
 200 VDU 255
 210 NEXT
 220 PRINT TAB(posX,vposX)
;
 230 ENDPROC
```

*Program IV*

The procedures created in each program are designed to be incorporated into your own listings.

So that they will not corrupt values of variables that you may be using, all variables used by the procedures are made local.

Further, the text cursor is always returned to the position it was at immediately before the call was made.

All three procedures use the VDU23 statement to redefine character number 255.

If that character is being used elsewhere in your program another character should be used by the procedures.

After entering the programs you may then like to try creating a procedure that combines the first and third techniques to create double height italic script.

● *Next time we'll be looking at Oswords and their use in machine code. We'll develop programs that use the sound and envelope facilities, then you'll be able to include music and sound effects in your machine code games.*


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MATHS WORKOUT

**MIKE BIBBY continues his series on how your Electron works**

# The masked bytes are taking control

**LAST month we learned a lot about the binary system – the numbers our micro works in.**

We saw that its memory is divided up into bytes – a set of eight two-state, binary units called bits. Each bit can have the value 1 or 0.

If a bit has the value 1 we say it is set. If a bit has the value 0 we say it is clear.

As we're dealing with eight bits at a time, we can use various combinations of the bits in a byte to code any whole number (integer) in the range 0 to 255.

To do this we associate a code number with each bit. Figure I shows the scheme.

Our eight bits are labelled b7 . . . b0 and the numbers associated with each number are shown above each bit (the more mathematical among you will see that they're in ascending powers of two).

To discover the value coded in a byte we simply add the numbers associated with every bit that is set (1), ignoring all clear bits (0). So:

**%10101000**

codes the number:

**128 + 32 + 8 = 168**

We also learned to do tricks with, or to put it more properly, manipulate, binary numbers. We could create the complement of a number – a sort of binary opposite – by changing every clear bit to set ("setting" the bit) and changing every set bit to clear ("clearing" the bit).

So the complement of the above number:

**%10101000**

gives us:

**%01010111**

We can add and subtract binary numbers, as well as multiply and divide. We learned other ways of combining them too, with the logical operators AND, OR, EOR.

When combining two binary numbers under the influence of these operators we compare each bit in one number with the corresponding bit of the other.

Then, according to a rule which depends on the operator we're using, we decide whether that particular bit (the result bit) in the "answer" byte is set or clear. Table I shows the rules for the operators.

As we've said, a micro's memory is divided into byte-sized compartments, called memory locations. Each location has a number associated with it so we know which one we're talking about.

These numbers are known as memory addresses.

Much of what a microprocessor does involves moving information – in the form of binary numbers – from one location to another.

If you cast your mind back to earlier articles, I said that each bit was like a switch – its two values 1 and 0 could be used to signify that the switch was on or off respectively.

Imagine that we could wire up one of our bits to a machine's on/off switch. Then by setting that bit we could switch the machine on, and by clearing it we could switch it off.

This sort of thing is possible, though we'd need to use some clever electronics.

In fact, since we deal with eight bits at a time, we could arrange things so that a single byte controlled the on/off status of eight separate machines – each machine m7,m6 . . . m0 corresponding to an individual bit of that byte, b7,b6 . . . b0. We'll term that byte the control byte.

We call such arrangements memory-mapped output, since what we put in memory maps, or sets the pattern for, what happens in the outside world.

Most microprocessors support this or some similar sort of output. Figure II shows the type of scheme we mean.

Assuming we've got things connected up properly, if we

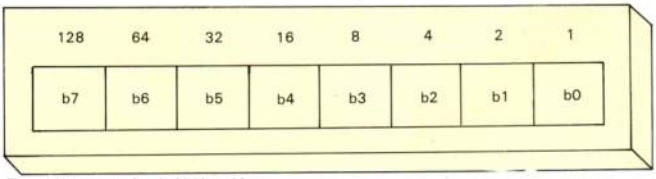


*Figure I: Values associated with bit positions*

| | |
|---|---|
| **AND** | Sets the result bit only if both bits compared are set, otherwise the result bit is clear. |
| **OR** | Sets the result bit if either or both the bits compared are set. Only if both bits compared are clear is the result bit clear. |
| **EOR** | Sets the result bit if the bits being compared differ in value. If the EOR bits compared are identical, the result bit is cleared. |

*Table I: Rules for logical operators*

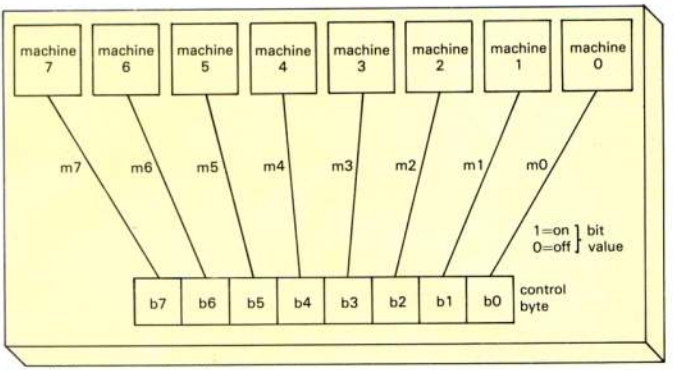


*Figure II: Memory mapped control*

then load the control byte with:

**%11111111**

all the machines would be on.

Remember that if a bit is set the corresponding machine is on. If we want to switch all the machines off, we can load the control byte with:

**%00000000**

And, of course, we can have any on/off pattern of machines, setting or clearing the relevant bits by loading the control byte with new numbers. Loading it with:

**%11110000**

is one way of switching off half the machines.

Sometimes, though, we might want to switch a particular machine or two on or off without knowing (or caring) whether the others are on or off.

This means we need some way of affecting only the bits controlling those machines, while leaving the others unchanged.

Suppose we wanted to switch off a machine – say m6. We can do this by making b6 of the control byte zero.

To clear that one bit to zero we AND the control byte with another byte – called the mask – the bits of which are set (1) except for b6, which will be 0. That is, we AND the control byte with:

**%10111111**

We then make this result our new control byte, and off the machine goes.

To see how it works in practice, let's assume that initially all the machines are on, so the control byte is:

**%11111111**

To switch machine m6 off we must AND it with:

**%1011111**

The sum is:

```
          %11111111  control byte
AND       %10111111  mask
          ---------
          %10111111  new control byte
```

As you can see, the outcome is that when we update the control byte with the result, m6 is switched off while the others remain on.

The trick isn't hard to see. Let's consider things from the point of view of bits in the mask.

If the bit is a 1, when you AND it with the relevant control bit the resulting bit is the same as the control bit. That is, ANDing a bit with 1 leaves that bit unchanged.

Think about it. If the control bit were 1, then as 1 AND 1 = 1, you're left with 1. The bit's unchanged.

If, on the other hand, the control bit were 0 then, as 0 AND 1 = 0, the bit remains unchanged as 0.

In other words bits in the mask with 1 in them leave the corresponding control bit unchanged.

So for machines whose on/off status we don't want to alter – we may not even know if they're on or off – we set the corresponding bit in the mask to 1.

However if the bit in the mask were clear (0) it wouldn't matter what the state of the original control bit was – the result would still be 0.

Say the control bit was 1, then as 1 AND 0 = 0 the resulting bit is a 0.

Alternatively, if it were 0, since 0 AND 0 = 0 the resulting bit is again 0.

So bits in the mask with 0 in them set the corresponding bits in the result byte to 0.

This means to switch specific machines off we construct a mask consisting of 1s for the machines we wish to leave unchanged and 0s for the machines we want off – in the appropriate bit positions.

We then AND the mask with the control byte and then make the resulting byte the new control byte.

Fine, but how do we switch on specific machines?

Well, we update the control byte by ORing it with another mask.

This time we put 1 in the bits corresponding to the machine we want on, and 0 in the bits corresponding to the machines whose on/off status we wish to leave unchanged.

This works, since when you OR a bit (whether 0 or 1) with another bit whose value is 1, the answer is 1. That is **0 OR 1 = 1** and **1 OR 1 = 1.**

So using a 1 in the relevant bit of an OR mask will set the corresponding result bit. When this becomes the new control byte the corresponding machine will be turned or left on.

On the other hand, ORing a bit in the control byte (no matter what value) with 0 leaves that bit totally unchanged since **1 OR 0 = 1** and **0 OR 0 = 0.**

So when we OR the bits of the mask that are 0 leave the corresponding bits of the control byte unchanged.

This means, to switch specific machines on we use a mask consisting of 0s for the machines we wish to leave unchanged, and 1s for the machines we want on – in the appropriate bit positions.

We then OR that mask with the control byte and make the resulting byte the new control byte.

Hence, to ensure that m6 is definitely on, we OR the control byte with:

**%01000000**

For example, if m6 is off, and all the rest on, to switch m6 on we do the following:

```
          %10111111  control byte
AND       %01000000  mask
          ---------
          %11111111  new control byte
```

Of course, both AND and OR have uses for the micro enthusiast other than controlling machines.

● *Next month we'll have a look at some, as well as uses of Exclusive OR.*

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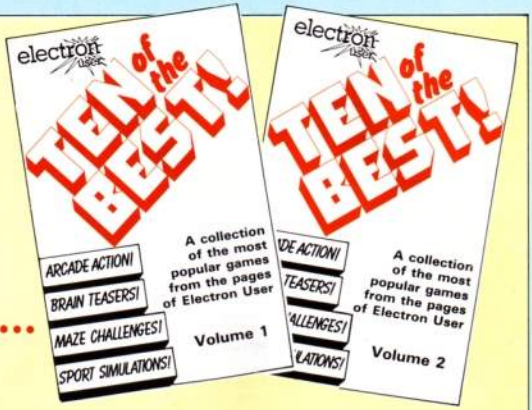

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**Volume 2 contains:**

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*Machine code thrills as you help to save the world from destruction.*
***Bunny Blitz***
*Go egg collecting, but keep away from the proliferating rabbits.*
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*Build castles – but beware the rising tide and hungry sandworms.*
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*Test your reactions with this traffic lights simulation.*
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*Jump for your life in this exciting arcade action game.*
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*Test your wits and reflexes in this popular classic ball game.*
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*Crack the code in a colourful if frustrating brainteaser.*
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*Save the plunging sky divers from a watery end.*
***Star Fighter***
*Attack the bandit ships in this fast-moving 3D punch-up.*

**TO ORDER, PLEASE USE THE FORM ON PAGE 61**

# YOU AND YOUR MICRO OF MANY COLOURS

**Part Two of the Electron graphics series by TREVOR ROBERTS**

**IF you followed last month's article you should have no problems understanding why the commands:**

```
MODE 5
COLOUR 130
COLOUR 0
```

**produce black letters on a yellow background.**

The MODE command puts the Electron into Mode 5, a four colour mode which has a screen of 32 lines, each holding 20 characters.

The default condition on entering this mode is that the text consists of white characters on a black background.

However if we're not content with this we can always change the colour of both the text and the background using the keyword COLOUR. To change the foreground colour we use:

```
COLOUR logical colour
number
```

while to change the background we use:

```
COLOUR logical colour
number +128
```

The logical colour number is a label. As we've said, Mode 5 has four colours so if you're going to label them with numbers it seems logical to use the numbers 0 to 3 – you might think that 1 to 4 is more logical but computers start counting at 0, not 1.

For Mode 5 the default logical colours are:

```
0 Black
1 Red
2 Yellow
3 White
```

It's these numbers that we've been using with our COLOUR command. Nice though it would be to use:

```
COLOUR red
```

to get red letters, the micro works in numbers not words, so you have to use:

```
COLOUR 1
```

to get your red letter day.

Now when you bought your Electron you were probably told that it had 16 colours. Yet Mode 5 only has four colours. Were you misled?

No, you weren't. You can have 16 colours ranging from black to blue, through cyan and on to flashing magenta-green and white-black.

But, and it's a big but, in Mode 5 you can only have four of them at any one time.

As we said last time you can look on the logical colour numbers as paint pots. In Mode 5 the pots themselves are numbered from 0 to 3.

The COLOUR command decides which paint pot is used for text and background. When we enter the mode four pots are already filled with black, yellow, red and white.

However, we're not stuck with these shades. We can fill the paint pots with any of 16 colours but as we've only got four pots in Mode 5 we can only have four of the 16 colours at any one time.

Having said we can change the colours in the pots, let's see how we do it.

Suppose we wanted to fill pot 3 with blue paint, rather than the white we have in it as a default. It would be nice if we could do something like:

```
FILL pot 3 with blue
```

Alas it's not so easy. Remember that the micro uses numbers not words, so its instructions tend to be numbers as well. Instead of FILL we have VDU 19 and instead of pot 3 we have the logical colour number. So our instruction becomes:

```
VDU 19, logical colour
number,blue
```

Now the logical colour number is just the number we've used in our COLOUR command, 3 so we get:

```
VDU 19,3, blue
```

The trouble is that we've still got the word blue in the instruction and this has to be a number. In fact it has to be the actual colour number which is just a label for the colour of paint we want to put in the paint pot.

As there are 16 of these colours there are 16 numbers, one for each, and, as computers start at 0, they're numbered 0 to 15.

Figure 1 shows which shades the actual colour numbers refer to.

So since we want blue paint in paint pot number 3 we use:

```
VDU 19,3,4
```

as 4 stands for blue. However this still won't work as, for reasons best known to themselves, Acorn insists that the command has three 0s tagged on the end. So to change logical colour 3 to blue we use:

```
VDU 19,3,4,0,0,0
```

It's an amazing command. Not only does it ensure that from now on anything displayed using logical colour 3 is blue, it also works backwards.

Anything still on the screen

→

| Numbers | Actual colour |
|---|---|
| 0 | black |
| 1 | red |
| 2 | green |
| 3 | yellow |
| 4 | blue |
| 5 | magenta |
| 6 | cyan |
| 7 | white |
| 8 | flashing black-white |
| 9 | flashing red-cyan |
| 10 | flashing green-magenta |
| 11 | flashing yellow-blue |
| 12 | flashing blue-yellow |
| 13 | flashing magenta-green |
| 14 | flashing cyan-red |
| 15 | flashing white-black |

*Figure 1: Actual colour numbers*

## *From Page 51*

that was previously using logical colour 3 suddenly turns blue as well. VDU 19 appears to work backwards.

To put it formally, the structure of the VDU 19 command is:

```
VDU 19,logical colour
number,actual colour
number,0,0,0
```

I think of it as:

```
VDU 19, pot number, paint
number,0,0,0
```

which I find easier to understand.

Notice that when we turned logical colour 3 blue the other three logical colours (0-2) are unaffected. COLOUR 1 still gives red text, COLOUR 2 yellow and, of course, the background is still black.

Try putting other colours of paint into logical colour 3. If you want it to be green a quick look at Figure I should convince you that:

```
VDU 19,3,2,0,0,0
```

will do the job.

Note that when you do this everything that was blue now magically turns to green. It's logical if you think about it.

Mode 5 only has four colours and the first three are unchanged. The fourth was blue and now we've turned it to green.

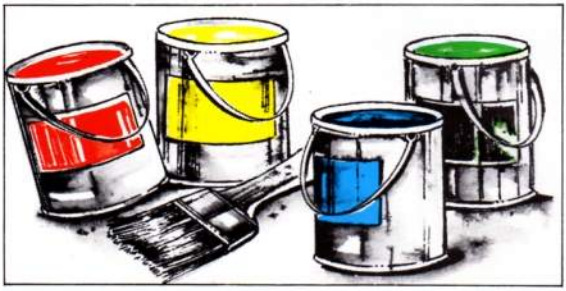
If nothing was done about it this would leave five colours (black, red, yellow, blue and now green) which is against the rules. Something's got to give, so all the blue turns to green.

Try assigning different actual colours to the four logical colours and see what happens. You can look on Figure I as a palette of the hues available. The following lines should start you off:

```
VDU 19,1,3,0,0,0
VDU 19,2,9,0,0,0
VDU 19,0,3,0,0,0
```

Don't worry if you get a little confused between the two colour numbers, logical and actual. A little practice and you'll soon get the hang of it.

If you want another way of looking at it you can think of the logical colours as being



pens and the actual colours referring to the inks that fill the pens.

In Mode 5 we've got four pens but 16 inks to choose from and, of course, a pen can hold only one ink at a time.

The COLOUR command chooses which pen is used while the VDU 19 decides which ink will fill that pen.

In this scheme of things the VDU 19 command can be viewed as:

```
VDU 19,pen number,ink
number,0,0,0
```

So far we've stuck to Mode 5 for each experiment. Why not change to Mode 1, another four colour mode, with:

```
MODE 1
```

and play around with COLOUR and VDU 19. You'll see that the default colours are just the same as Mode 5.

Modes 0, 3, 4 and 6 are two colour modes. In effect these are restricted to two pots of paint, though there is still the choice of one of 16 colours for each pot (or 16 inks for each of the two pens).

In these modes the default colours are black and white, so the logical colour numbers and defaults are:

```
0 Black
1 White
```

The Electron's final mode is the 16 colour Mode 2. Here you can have up to 16 colours on the screen at any one time with the logical colour numbers going from 0 to 15.

Unsurprisingly, when you enter Mode 2 these logical colour numbers correspond to the actual colour numbers of Figure I.

However, if you wished you could use VDU19 to fill all the pens with blue ink.

You've got 16 pens and you can fill them with the colours you want. In other words, you're not stuck with the default.

Figure II shows the logical colour numbers available in each of the seven modes, along with the default actual colours assigned to them.

Use it to explore the effects of the COLOUR and VDU 19 commands in the different modes.

This should keep you busy until next month, when we'll be taking a closer look at the Electron's modes and also using the commands we've learnt in some colourful programs.

**MODES 0, 3, 4, 6**

| Logical number | | Colour (on entering mode) |
|---|---|---|
| Foreground | Background | |
| 0 | 128 | Black |
| 1 | 129 | White |

**MODES 1, 5**

| Logical number | | Colour (on entering mode) |
|---|---|---|
| Foreground | Background | |
| 0 | 128 | Black |
| 1 | 129 | Red |
| 2 | 130 | yellow |
| 3 | 131 | White |

**MODE 2 (and actual colours)**

| Logical number | | Colour (on entering mode) |
|---|---|---|
| Foreground | Background | |
| 0 | 128 | Black |
| 1 | 129 | Red |
| 2 | 130 | Green |
| 3 | 131 | Yellow |
| 4 | 132 | Blue |
| 5 | 133 | Magenta |
| 6 | 134 | Cyan |
| 7 | 135 | White |
| 8 | 136 | Flashing black-white |
| 9 | 137 | Flashing red-cyan |
| 10 | 138 | Flashing green-magenta |
| 11 | 139 | Flashing yeloow-blue |
| 12 | 140 | Flashing blue-yellow |
| 13 | 141 | Flashing magenta-green |
| 14 | 142 | Flashing cyan-red |
| 15 | 143 | Flashing white-black |

**N.B.** The foreground logical colour numbers on entering Mode 2 are also the actual numbers.

*Figure II: Logical colour numbers and their defaults*

# Micro Messages

## Power supply jack can be a problem

*A WORD of warning to Electron users who are in the habit of resetting their machines by unplugging the power supply jack plug on the right side of the case.*

*The jack socket is soldered directly to the voltage regulator PCB and the repeated insertion and removal of the plug strains the soldered connections and eventually tiny cracks in the solder cause momentary interruptions to the power supply and the machine consequently resets losing the entire contents of memory.*

*I suffered several such unexplained resets before tracing the problem, which was easily remedied by opening up the computer, removing the PSU board and resoldering the three contacts.* – **Andrew Rance, London SW.**

● Many thanks Andrew for your most useful advice which should be noted by all our readers.

To add to this, the Electron should be turned on and off at the mains socket to avoid wearing out the solder connections on the voltage regulator.

## Value of the Plus 3

*I HAVE considered buying an Electron Plus 3 for some time. What has stopped me doing so is that other makes seem to be so much more versatile than the Plus 3.*

*Will I be able to run long commercial software which I hope to transfer from tape to disc even though the Plus 3 uses nearly 4k of RAM?*

*I have also been wondering if it is possible to join two Electrons together to give double the memory.*

*If I fitted the Mode 7 adapter and the Turbo Driver which doubles the Electron's speed would I then be able to run all BBC software? It sounds possible, but seems a little too easy.* – **M.P. Hanley, Plymouth.**

● It's not true to say that other disc drives plus interfaces are better than the Plus 3. They all have their advantages and disadvantages.

For instance, the Plus 3 allows an unlimited number of files on the disc, but the Cumana does not.

The Cumana however does not use up any RAM and the Plus 3 uses nearly 4k.

You've got to look carefully at each system and see whether it does what you want it to do.

The Plus 3 can be disabled, allowing long programs to be run from tape.

T2P3 from Slogger transfers software to Plus 3 disc.

You can't join two Electrons together, but Advanced Computer Products are going to produce an interface to allow a second processor to be plugged in.

This gives more memory and a good speed increase. Second processors are very expensive though.

Software which does not run on an ordinary Electron will not run after fitting a Mode 7 adapter and Turbo Driver.

Software that does run will be much faster and more colourful.

## Games for Electron

*IN the November issue of* Electron User *I read a letter from P.A. Phillips who asked Acornsoft whether Revs was going to come out for the Electron.*

*I thought that you could get all the Acornsoft games on the BBC for the Electron.*

*Why can't more software houses publish games for the Electron? All the games in Boots are for the Spectrum, 64, Amstrad, BBC and even the MSX.*

*Come on software houses, start publishing games for neglected machines.* – **Stuart Hannah, Smallfield, Surrey.**

● Unfortunately, very few of Acornsoft's BBC games work on the Electron. You will find that Electron versions of the ones that do work exist anyway.

Even so, other software houses are producing excellent games well worth buying.

## Point of View

*KNOWING how long it takes for a letter to appear in a magazine, Basil Crowhurst (Micro Messages, December) has by now probably sorted out his problems with the printer driver program for View, but my own experience may be of interest.*

*I too have a JP101 spark jet printer and I initially had great difficulty in exploiting its full capabilities.*

*Having discovered the very limited printing facility offered by the resident printer driver in View, I returned to the shop where I bought the printer.*

*They approached Acornsoft on my behalf but were told that the Acornsoft printer driver package would still not allow all the print variations available on the JP101.*

*Eventually I solved the problem by producing my own driver which enables me to use all the many and varied print styles of which the Olivetti JP101 is capable.*

*I have also devised a very simple screen dump for Mode 0 graphics (see listing) which, because it is entirely written in Basic, takes four and a half minutes to dump the screen to the JP101.*

*There is a better way, and I plan to write a more flexible and efficient dump routine in machine code – when I learn how.* – **Andy Dear, Clackmannanshire.**

```
10000 REM Mode0 screen dump
10010 REM For JP101 printer
10020 REM By Andy Dear
10030 VDU2
10040 VDU 1,27,1,71,1,49
10050 VDU 1,48,1,48,1,59
10060 VDU 1,56,1,48,1,59
10070 VDU 1,51,1,50,1,59
10080 VDU 1,52,1,27,1,90
10090 FOR U%=12288 TO 32128
 STEP 640
10100 FOR W%=U% TO U%+7
10110 FOR P%=W% TO W%+632 S
TEP 8
10120 VDU 1,?P%
10130 NEXT P%
10140 NEXT W%
10150 NEXT U%
10160 END
```

## Transfer to disc

*HAVING recently taken advantage of your outstanding bargains, I bought a Plus 1 and 3.*

*I got the Plus 3 because of its advantages over tape recorders, so when I saw your tape-disc program it was a godsend.*

*However on most of my commercial games the computer throws out the following message – LOCKED AT LINE 80.*

*Can you tell me how to overcome this flaw in your tape-disc program?* – **S. Williams, Leicester.**

● There isn't a flaw in the program. As stated in the

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article, it will not copy commercial software.

We would get into all sorts of trouble if we published a program that could be used to pirate software.

Slogger's T2P3 will transfer most of your software to Plus 3 disc.

You won't be able to run the software without T2P3 which prevents piracy while still allowing you to have a copy on disc.

## Spoilt for choice

*I AM considering getting a disc drive for my Electron.*

*With so many on the market, it is difficult to find a suitable one with Integral PSU to use with the Solidisc GFS and Plus 1 interface.*

*Can you recommend one or two 40 track models priced around £100?* – **Andrew Heavens, Clacton on Sea, Essex.**

● There's not much to choose between different makes of disc drives.

We use a peculiar combination of Cumana drives in the office – dual 80 track 3½in and 3½in plus 5¼in 40 track drives in tandem.

All work perfectly and are reasonably priced as well.

## Lawful transfer

*HOW can I transfer my cassette programs, mainly Acornsoft and Superior Software, on to disc without contravening the copyright laws?*

*Cumana Disc Interface and 5¼in 80 track drive. I have no wish to break any of the copying codes of practice, but I also do not want to continue wasting time running programs from cassette.*

*Are there any good utility ROMs or other software available which will help me get these programs on to disc?*

*I understand that some transfer ROMs only allow those copied programs to run on the machine used to transfer them, but this is OK as I only want to use them for myself.*

*Unfortunately I am not a computer wizard capable of writing vast complicated programs to do this sort of thing.*

*What I want is to be able to use a computer as a useful tool without too much trouble.* – **Alistair Rose, Penkridge, Staffordshire.**

● Slogger's T2CU ROM will transfer most of your software to Cumana disc.

The Cumana disc interface has a socket free for a ROM such as this.

***WHAT would you like to see in future issues of Electron User?***

***What tips have you picked up that could help other readers?***

***Here is your opportunity to share your experiences.***

***Remember that these are the pages that you write yourselves. So tear yourself away from your Electron keyboard and drop us a line. And please, if you want a reply, enclose an SAE. The address is:***

***Micro Messages***
***Electron User***
***Europa House***
***68 Chester Road***
***Hazel Grove***
***Stockport SK7 5NY.***

## Formatting both sides

*I BOUGHT my Electron 18 months ago and have recently expanded it by adding the Plus 1 and Plus 3, which has made the advice and information provided by* Electron User *indispensable.*

*Could you tell me how to format both sides of my double sided discs because, although the manual supplied with the Plus 3 describes how to format discs, I have only been able to format one side.*

*Since buying my Plus 3 I have found that the software available on microfloppies is very limited. I would therefore like to run BBC disc-based software on my Electron.*

*Is this possible? If so and what additional equipment would be required?* – **Miss J. Russell, Queens Park, London.**

● Unfortunately you won't be able to format both sides of your discs because your Plus 3 disc drive only has one read/write head.

This means that you can only use one surface of your disc to store data even though your discs are double sided.

The only way you'll be able to use both sides is to add a second 3½in double sided drive to your Plus 3. This will be very expensive.

At present the only way you'll be able to run a handful of BBC discs is to attach a 5¼in disc drive to the Plus 3 and use ACP's 1770 DFS (see the February 1985 issue of Electron User).

With this set-up you'll be able to use a few selected BBC software packages.

You won't be able to use all BBC programs for several reasons, including protection, lack of Mode 7 and illegal programming.

As I'm sure you are aware, this configuration will also be costly.

## Shaded dumps

*WHAT is the price of the Epson LX80 printer reviewed in the February 1986 issue of*

# Shapely asteroids

*I HAVE written a routine to draw asteroids.*

*Although it looks rather complicated to the non-mathematical it can be easily altered to produce many different shapes.* – **J. Flynn.**

● It's a pleasure to see such an interesting program that's well worth the effort of typing in.

```
  100 REM ASTEROID VARIATIO
NS
  110 REM BY J.Flynn
  120 REM
  130 MODE 1:GCOL 16,2
  140 an=0:ad=PI/25
  150 PROCfirst(600,500,200
)
  160 PROCsecond(600,300,20
0)
  170 PROCthird(300,500,100
)
  180 PROCthird(900,500,100
)
  190 PROCfourth(600,800,10
0)
  200 END
  210 DEF PROCfirst(X,Y,R)
  220 MOVE X+R,Y
  230 FOR K=0 TO 2*PI STEP
ad
  240 an=an+ad
  250 DRAW X+R*(COS(3*an)+3
*COS(an))/4,Y+R*(3*SIN(an)-
SIN(3*an))/4
  260 MOVE X,Y
  270 NEXT:ENDPROC
  280 DEF PROCsecond(X,Y,R)
  290 MOVE X+R,Y
  300 FOR K=0 TO PI STEP ad
  310 an=an+ad
  320 DRAW X+R*(COS(3*an)+3
*COS(an))/4,Y+R*(3*SIN(an)+
SIN(3*an))/4
  330 NEXT:ENDPROC
  340 DEF PROCthird(X,Y,R)
  350 an=0:MOVE X+R,Y
  360 FOR K=0 TO 2*PI STEP
ad
  370 an=an+ad
  380 DRAW X+R*(COS(3*an)+3
*COS(an))/4,Y+R*3*(SIN(an)-
SIN(3*an))/4
  390 NEXT:ENDPROC
  400 DEF PROCfourth(X,Y,R)
  410 MOVE X,Y+(R/4)
  420 FOR K=0 TO 2*PI STEP
ad
  430 an=an+ad
  440 DRAW X+R*(SIN(2*an)+2
*SIN(an))/4,Y+R*(2*COS(an)-
COS(2*an))/4
  450 NEXT:ENDPROC
```

Electron User?

*As I have recently acquired a Plus 1 I am seriously thinking of buying a low cost printer, and was impressed by this particular one.*

*I have another question concerning the leads. Will the LX80 need any adaptation or will it fit directly into the Centonic printer interface on the Plus 1.*

*Please could you send me a screen dump program for the printer as it would help a great deal.* – **G. Sheldon, Barry, South Glamorgan.**

● The Epson LX80 costs around £220. You'll find a simple screen dump in the March 1985 issue of *Electron User.*

There's a superb dump coming up soon which prints each colour a different shade of grey – watch out for it!

## New lease of life

*SINCE discovering your magazine my Electron has had a rejuvenation.*

*I originally took Acorn User but was dissatisfied with the quantity and quality of space devoted to the Electron.*

*I have recently bought the Plus 1 Electron Workstation package and have now managed to find my way around View, which I am generally pleased with.*

*However it does seem to have some strange features.*

*When inserting or deleting text, or when scrolling using the Return or cursor keys, action carries on long after the particular key has been released. Is this a common feature?*

*My serious problem occurs when I print out hard copy.*

*I am using an Epson FX-80 and cannot get text printed at the top of the page.*

*When I give the PRINT command, printing starts nearly a third down the page.*

*Also when the command SCREEN is given the text appears about half way down the TV screen.*

*I have tried using the relevant stored commands such as Page Break and Page Length but without effect.*

*The Page Length command has no effect for at least two pages, and headers and footers do not print or screen on these pages although they do appear further on.*

*Is the View cartridge faulty?* – **Neil Windsor, Pencoed, Mid-Glamorgan.**

● View on the Electron is very slow at times. Consequently if you hold a key down the keyboard buffer fills up with the character and View carries on long after you've taken your finger off the key.

The reasons is that it only looks at the buffer and not the key itself.

You can slow down the auto repeat action of the keyboard with:

```
*FX12,20
```

This should cure the problem. There's nothing wrong with your version of View.

To print at the top of the page you'll need to set the top margin and header margin to zero.

Start the letter or document by pressing Caps Lk/Func 0 and enter TM 0. On the next line enter HM 0.

This should do the trick.

## Manic Mole screen 9

*HERE is a tip to help Helen Williams who complained in the November 1985 issue about missing out screen 9 on Manic Mole in the July 1985 issue of* Electron User.

*There is no need to miss it out and you can make it easier by changing the VDU statement in line 1070 to read:*

```
1070IF room%=9 VDU
19,0,0,0,0,0
```

*This will display the maze in screen 9.*

*When you are sure you can remember the maze change the VDU back to its original form.* – **David M. Goffin, Hull.**

● I'm sure Helen will be grateful for this tip. It's nice to see our readers responding regularly with useful hints.

# Repton guide

*CONCERNING Micro Messages January 1986 and Neil Barick's PS on completing Screen J on Repton, the following information should help him. All instructions refer to the diagram below:*

*1. Remove soil from G1 and H1.*

*2. Push boulder B1 to H1.*

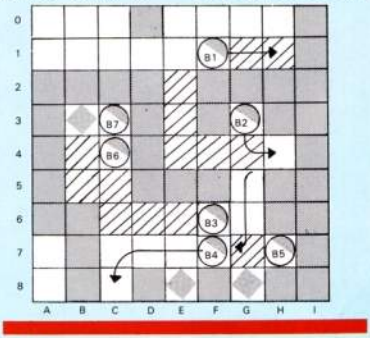
*3. Go under boulder B2 – move left then right quickly, thus pushing boulder to H4.*

*4. Go down to G7. Do not get diamond G8.*

*5. Push boulder B4 to C8 allowing B3 to drop.*

*6. Collect soil E6 to B4.*

*7. Collect the diamonds – and that's it for the right corner.* – **Steve Gainham, Burton-on-Trent, Staffordshire.**




## Useful printer

*I MUST spread the word to other Electron users about the Centronics GLP printer.*

*I was looking for a low cost, non-thermal dot matrix printer to use with my Electron and was beginning to think there was no such thing.*

*Then I went to the Electron & BBC Micro User show this autumn, and saw the GLP Great Little Printer in action on Viglen's stand.*

*I was so impressed that I bought one for a very reasonable £145.*

*After plugging it into my Plus One I was away, using all the usual features such as condensed and enlarged characters and italics. The near letter quality mode was particularly impressive.*

*The GLP is fully Epson-compatible, so all my various screen dumps worked fine, together with the Mini Office suite of programs.*

*Although almost identical to the Brother M1009, it is slightly cheaper and has the very useful NLQ mode.*

*By the way, does anyone know how to get the GLP to print graphics characters, the Greek alphabet or maths symbols?* – **Ian M. Brown, Totley, Sheffield.**

## Loading Plus 1

*I OWN a Plus 1 and am having problems loading and running a few of my programs with it attached.*

*I understand it is possible to overcome this problem without disconnecting the Plus 1.* – **B.A. Crease, Wilstead, Bedford.**

● Typing in:

```
*FX163,128,1
?&212=&D6
?&213=&F1
?&2AC=&B
```

will totally disable the Plus 1 allowing all software to load and run.

# Never before

**... has there been such a helpful, easy-to-understand guide to BBC Basic**

There has been an enthusiastic welcome from users of the Electron to "Getting Started on BBC Basic". And with good reason. For its author, Mike Bibby, is acknowledged to be one of Britain's leading experts on BBC Basic, and in it he achieves new standards in simplifying the teaching of Basic programming.

The book takes the reader step by step through the fundamentals of writing programs.

Its hands-on approach has been specifically designed to teach the absolute novice not only the formal rules of Basic but also that elusive quality – good programming style.

By working through its many examples, the reader will gain a clear insight into structured programming, and will quickly acquire the ability to use structured techniques in creating his own programs.

*The chapters include:*

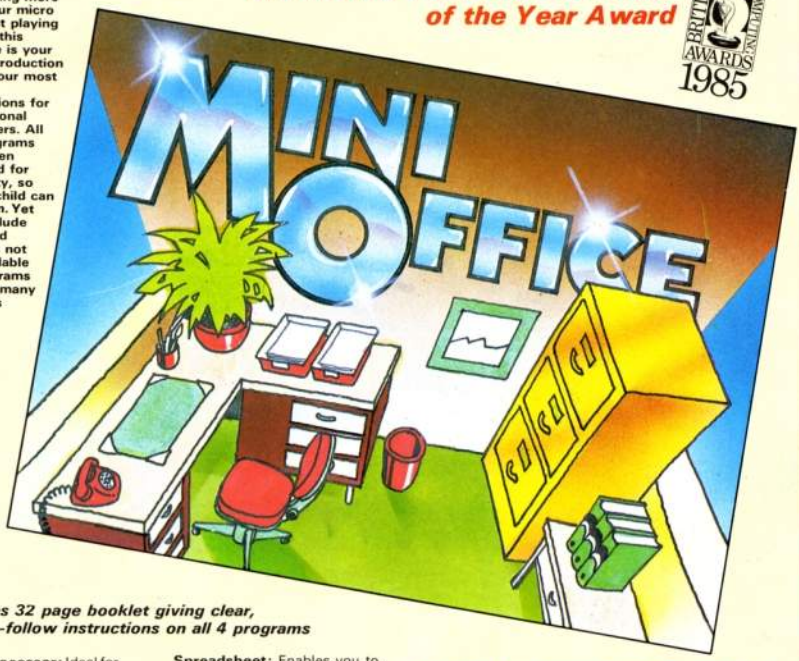
- ★ Basic ideas – printing strings and numeric expressions
- ★ RUNning your first programs
- ★ Strings and simple editing
- ★ Getting data from your keyboard with INPUT
- ★ REPEAT ... UNTIL, the building blocks of loops
- ★ Controlling loops with FOR ... NEXT statements
- ★ Modes and colour
- ★ Introducing procedures – a taste of structured programming
- ★ How to use subscripted variables
- ★ Nested loops
- ★ Into the second dimension with arrays
- ★ String manipulation
- ★ Simple data structures

*TO ORDER, PLEASE USE THE FORM ON PAGE 61*

If you want to start doing more with your micro than just playing games, this package is your ideal introduction to the four most popular applications for professional computers. All the programs have been designed for simplicity, so even a child can use them. Yet they include advanced features not yet available on programs costing many times as much!

***Finalist for the Home Software of the Year Award***

NOMINATED FOR MICRO COMPUTING BRITISH AWARDS 1985

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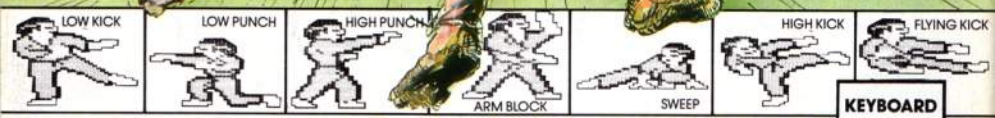
# KARATE COMBAT

THE INTRODUCTORY RITUAL

IN MID BATTLE




**ELECTRON**

**BBC MICRO**

**KEYBOARD**

**JOYSTICKS**

Set in the realm of the mystic Orient, Karate Combat pairs you, in thrillingly realistic battle, against 16 of the mightiest and most skilful exponents of "open-hand" fighting. Each opponent has different fighting characteristics and you must cunningly use different techniques to tackle each adversary. Your aim is to move up the rankings and eventually do battle against the 16th opponent, the ultimate challenge — The Master! In addition to the competition mode, the program includes a 2-player mode and a practice mode, complete with a punch-bag, to enable you to master your repertoire of punches, kicks, blocks, spins, sweeps and the spectacular flying kicks.

**PRICE: £8.95 (cassette), £11.95 (BBC disc)**

## COMPETITION COMPETITION COMPETITION COMPETITION

**COMPETITION** — If you defeat The Master you can enter our competition with a chance of winning an impressive trophy (pictured on the right) and the cash prize of **£100.** Closing Date: 30th September, 1986.

**SUPERIOR SOFTWARE** Limited

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Access VISA

**OUR GUARANTEE**

- All mail orders are despatched within 24 hours by first-class post.
- Postage and packing is free.
- Faulty cassettes and discs will be replaced immediately.

**WE PAY TOP ROYALTIES FOR HIGH QUALITY SOFTWARE**